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AFIT/GEM/LSR/88S-6

USAF CIVIL ENGINEERING PRIME BEEF ORGANIZATIONS, 1978-1987; REFINING THE READINESS POSTURE

THESIS

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THESIS

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

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Master of Science in Technical Management

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Introduction

This thesis addresses the three Prime BEEF (Base Engineer Emergency Force) reconfigurations and the resulting organizational structures. The Prime BEEF concept can be studied in terms of evolution, from its 1964 role as a new manpower function to a fully defined combat tool that supports today's tactical and strategic air combat. This progress can be reviewed in terms of the ever changing technology and international trends that define the perceived wartime engineering requirements; with destinations and engineering requirements so varied in modern war scenarios, their political and technological roots can be valuable in planning for future war efforts. That such concerns could affect AFCE operations is reason to evaluate their effects on warfighting capability. The AFCE responses to outside pressures (reconfigurations) have affected its ability to provide engineering combat support. A review of this relationship (reorganization vs. capabilities) and its positive and negative affects, can yield conclusions regarding the utility of past reposturings and recommendations for the use of similar or alternate approaches to future combat engineering development.

Balance between combat and peacetime roles will be illustrated by the study of their individual but parallel refinements through time. Technical and international

pressures can be understood through examination of resultant Prime BEEF policies; conflicting decisions to posture large team units (for troop cohesion) and small teams (for engineering utility), and redesignation of worldwide threat locations are examples. The transformations of team integrity, planning, training, and readiness reporting methods will be examined to illustrate the specific impacts of the revised policies, and overview of the operational implications will illustrate effects that may not be evident to those who have not worked within such a scenario.

There is no indication that a detailed evaluation of past reorganizations and structures has been used to assess the overall status of AFCE organization. Therefore, organizational efforts may be contrary to or even repetitious of those before them, unresponsive to long range, dynamic needs. If these shortcomings have occurred, the causes can be discovered and avoided in the future.

The pursuit of those causes and their effects is the basis of this thesis. The overview, history, and evolution of the Prime BEEF concept are detailed, and subsequent outcomes, impacts, and perceived implications (based on literature review and interviews) are studied. This information will strengthen the understanding of reconfigurations in the minds of readers. The reorganization issue will be summarized, and the

applicability of these conclusions to future AFCE trends will be discussed.

All of the information received in the research process could not be included in the final report. Through the telephone and mail systems and even in casual conversation, readiness experts offered insights that were worthy of several studies. Their discussion of the Prime BEEF program included such topics as overseas troops and firefighting forces, but this thesis was designed primarily to study one topic: the Continental United States (CONUS) troops that deploy to foreign locations for wartime construction and facility operations, maintenance, and repair. The airmen already in place in various theaters such as Europe or Asia are principally dedicated to those areas in the event of war; they are not nearly as vulnerable to changing political situations as the United States based forces liable for deployment to worldwide locations. Likewise, firefighting operations are more fully defined conceptually than the new construction and facilities concepts that are developed continually, and less affected, therefore, by technological change. The study of these various concerns, although integral in the minds of the experts, must be pursued through different academic treatments, in other forums. References to other works, to aid research efforts in other areas, are included in this thesis.

Chapter I contains the background and methodological information required for full understanding of the thesis; many of the aforementioned references to other AFCE research are found here. These allusions will help to define the sources for this effort, and will offer direction for the pursuit of topics not addressed herein. Chapter II reviews the four Prime BEEF structures and their development as both a personnel program and combat concern, to include the various technological and international issues that have shaped the evolution of the program. The third chapter explains the causes and effects of the reposturings from a more esoteric point of view; origins and operational outcomes that AFCE leaders are aware of may be interesting and even surprising to the less involved observer. Chapter IV addresses the specific impacts of the reorganizations on team integrity and cohesion, Prime BEEF training and planning, and the methods with which BCE (Base Civil Engineering) units and major commands assess the AFCE community's degree of readiness. The fifth chapter assesses the studies of Chapters II, III, and IV and evaluates the investigative questions and anticipated findings (found in Chapter I), as they are either supported or disproved in Chapters II, III, and IV, to yield the conclusions of this thesis. The final chapter, Chapter VI, addresses the overall thesis effort, paying particular attention to the

applicability of the conclusions to real world AFCE trends, daily operations, and professional opinions.

The leadership of the civil engineering (CE) community and the technicians of the numerous Air Force history offices shared their technical and historical knowledge throughout the research process; the success of the AFIT research process is in large part due to their continual support. While all of their shared knowledge could not be included in the scope of this work, it was all invaluable in understanding and pursuing the topic.

Last, and certainly most, I would like to thank my thesis advisor, Dr. David Vaughan, and my thesis readers, Maj John Stibravy and Capt Jon Wheeler, for their measured but erudite guidance. The combination of good advice, genuine concern, and freedom to work without rigid controls was their greatest contribution to my learning experience.

Table of Contents

		Page
Introduction		11
Abstract		ix
I.	Background and Methodology	1
	Overview and Justification	1
	Specific Research Problem	7
	Investigative Questions	7
	Methodology	7
	Assumptions	9
	Scope	9
	Constraints	10
	Anticipated Results	11
	Summary	11
II.	Personnel, Combat, Technological, and International Issues	12
	Overview	12
	The Original Prime BEEF Concept	13
	The CF-Team Concept	19
	The PB-Team Concept	22
	The CS-Team Concept	25
	Summary	28
III.	Historical Implications	30
	Overview	30
	Mobile Combat Support Teams	31
	Contingency Force Teams	34
	Prime BEEF Teams	35
	Combat Support Teams	37
	Logistics	39
	Summary	43
IV.	Team Integrity, Planning, Training, and Reporting Impacts	44
	Overview	44
	Team Integrity	45
	Planning	48
	Training	52
	Reporting	56
	Summary	61

Page

V. Evaluation 62
Overview 62
Investigative Questions 62
Anticipated Results 66
Summary 69

VI. Future Implications 71
Overview 71
Future AFCE Trends and Measures 71
Thesis Summary 75
Confirmation of Findings 77
Summary 79

Appendix A: Standard Prime BEEF Teams Since Program Inception 80

Appendix B: BEET/MCST Detailed Manning Chart 82

Appendix C: CF-Team Detailed Manning Chart 83

Appendix D: PB-Team Detailed Manning Chart 86

Appendix E: CS-1 Team Detailed Manning Chart 91

Appendix F: Thesis Research Interview Methodology . . 94

Appendix G: Glossary of Terms, Acronyms/ Abbreviations Used 98

Bibliography 100

Vita 105

Abstract

This thesis reviews the origins, impacts, and implications of four Air Force Civil Engineering (AFCE) Prime Base Engineer Emergency Force (BEEF) organizational structures from 1978 to 1987. Literature review and interview performance were the two primary methods employed to assess the present state of the Prime BEEF (PB) program; the study examined the issues in United States Air Force (USAF) use of the PB program for present and future combat engineering deployment and employment.

The research process, along with the results of a review of the thesis by AFCE professionals, indicated that the Prime BEEF concept has benefitted from reconfiguration and is presently more diverse and adaptable than ever before. While the present posture is not as applicable to the few specific combat scenarios that influenced earlier alignments, it appears that the new Combat Support program is a successful attempt to prepare for the volatile battlefield of today and the rapidly evolving technology of tomorrow.

The text of this thesis reviews many origins and possible applications of today's Prime BEEF organization, indicating that this AFCE program has been refined successfully and is ready for use in many future problem solving roles.

USAF CIVIL ENGINEERING PRIME BEEF ORGANIZATIONS, 1978-1987; REFINING THE READINESS POSTURE

I. Background and Methodology

Overview and Justification

United States Air Force (USAF) Civil Engineering has employed four Prime Base Engineer Emergency Force (BEEF) organizational structures in the last ten years, and there is no evidence that the most recent format will be the final one. Apparently, no configuration has yet been accepted as a satisfactory improvement over the previous concept, or as an adequate treatment of all possible uses. This thesis is an historical account of the three organizational reconstructions that have taken place since 1978. The original Base Engineering Emergency Teams (BEET) and Mobile Combat Support Teams (MCST) (1964-1978), Contingency Force (CF) Teams (1978-1984), Prime BEEF (PB) Teams (1984-1987), and Combat Support (CS) Teams (1987-Present) will be studied to assess their roles in the ongoing reconfiguration process, as possible results of external influences or indicators of evolving Prime BEEF capabilities.

Numerous recurring problems with daily engineering operations and notable shortcomings in contingency responses

(occurring in the late 1950s and early 1960s) made development of a more effective approach necessary. Prime BEEF was introduced as an official Air Force Civil Engineering (AFCE) contingency engineering program in 1964. Project Prime BEEF was a 1964 Civil Engineering Manpower Study Group comprised of AFCE experts and specialists from various personnel and manpower disciplines. They were tasked to establish a personnel structure for AFCE that would better serve the daily air base engineering requirements of the Air Force, while allowing for smooth transition and mobilization into a contingency or wartime engineering situation (34:5).

The Prime BEEF system that the study group developed included Base Engineering Emergency Teams (BEET) for Continental United States (CONUS) activities, and Mobile Combat Support Teams (MCST) for deployment to overseas locations. This organizational structure was characterized by squadron size teams, each comprised of the members of an existing Base Civil Engineering (BCE) squadron. The BEET/MCST structure was maintained until 1978, when the Contingency Force (CF) Team concept was initiated. CF-teams, unlike BEET and MCST units, were substantially smaller groupings, characterized by either a diverse, generic BCE capability or a more specialized skill array. CONUS BCE squadrons contained all or most of the standard CF-team complement, depending on which combination would

best fit their daily peacetime base engineering requirements. Deployments of AFCE contingents could include CF-teams from a single BCE squadron or combinations of different squadrons' teams, in response to CONUS or overseas requirements, depending on the standardized or specialized nature of the operation.

The CF organization was used until the reconfiguration of 1984, when the Prime BEEF (PB) team structure was introduced. The PB-teams, like the CF-teams, could perform either generic BCE operations or somewhat more specialized pursuits. The main addition to the new concept was a large number of small (3-person) teams, each of which represented the individual skills of the BCE squadron. This individual skill orientation created an AFCE capability to respond to an unprecedented degree of specialized peacetime and wartime requirements, and led to the possibility of vast combinations of different BCE units' personnel. The most recent reorganization, enacted in 1987, introduced the Combat Support (CS) team concept and reintroduced the squadron-size team standard, comprised of personnel from two BCE squadrons at most (the units are made of one squadron's airmen whenever possible, but since all squadrons are not large enough to field a complete team, combinations of two squadrons have been postured).

The AFCE community has many options in posturing the Prime BEEF organization. It can be configured in a diverse

manner (less efficient for specific needs but more continuous through time and changing scenarios), realigned periodically to meet distinct, changing threats (possibly causing confusion and disfunction), or postured in an attempt to achieve the benefits of both approaches. Maj Gen William Gilbert, USAF (Retired), former director of USAF Engineering and Services (and the director of the initial reposturing into CF-teams), believes the system should be reassessed and realigned as perceived USAF requirements for civil engineering support change (23). However, AFM 1-10, Combat Support Doctrine, states that organizational friction (the chaos resulting from the failure of events to follow plans) is a result of organizational realignment (15:3-3). This definition is descriptive of the early stages of war, but any peacetime realignment of forces would likely cause this outcome if war were to occur soon after. Given the frequency of recent reconfigurations, the danger of this wartime problem could be heightened. Lt Col Robert Bittner, Holloman AFB Base Civil Engineer (BCE) (and developer of the PB-Team concept in the early 1980s), offers this cautious advice about the CS concept:

> I believe the present structure is the simplest solution yet, and perhaps the most workable. I frankly don't want to see another Prime BEEF restructuring during my remaining years in the Air Force--I'm not sure the Prime BEEF officers and NCOs could stand it--but I believe some adjustment in the new structure is required if we are to effectively get our troops to war on available airlift resources (7).

Lt Col Bittner is a proponent of posturing individuals that are untasked on CS-teams into specialty teams, similar to PB-teams, to allow for efficient response to taskings not requiring an entire squadron.

There is a limited body of AFCE combat/emergency histories. The most prominent works, to date, include A History of Warfighting Capabilities of Air Force Civil Engineering: A Research Report, by Lt Col Floyd A. Ashdown, A History of Air Force Civil Engineering Wartime and Contingency Problems From 1941 to the Present, by Capt L. Dean Waggoner and Lt M. Allan Moe, and An Historical Development of the Organizational Structure of Air Force Civil Engineering Prime Base Engineering Emergency Forces (BEEF) From 1964 to 1978, by Capt Ronald D. Marlin. The thesis by Capt Waggoner and Lt Moe recommends further historical study of Air Force Civil Engineering combat capabilities in the Vietnam era and beyond. Capt Marlin's subsequent thesis advocates research of Prime BEEF restructurings following the era that he reviewed, as his study of Prime BEEF operations in Vietnam can be of importance in evaluation of subsequent organizational changes (34:58). Baruch Fischoff, author of the DOD (Department of Defense) report For Those Condemned to Study the Past: Reflections on Historical Judgement, supports such evaluation; "Our personal or collective past tells us what factors are important to understand, how good our

understanding is, and how many surprises to expect when making our plans" (20:i).

Reorganizations may substantially impact unit operations. Prime BEEF officers at Tyndall AFB (Air Force Base) and Wright-Patterson AFB estimate that their organizations spent $150,000.00 and $250,000.00, respectively, on new equipment necessary to meet the CS structure requirements (9, 49). Lead times and efforts required to re-equip the squadrons were substantial. AFCE has reconfigured Prime BEEF three times in ten years, and there are approximately 200 active duty, Air Force Reserve (AFRES), and Air National Guard Prime (ANG) BEEF units (29). Repeated reorganization of a system of this magnitude may be justified, but careful historical study would be necessary if this is to be proven. Fischoff addresses this process:

> Dependence on the past is in large part justified; where else could one turn for wisdom and accumulated experience? There has, however, been surprisingly little study of the cognitive (or thought) processes involved in historical judgement (20:i).

To study the thought processes involved in the realignment decisions, the management question "What has prompted the repeated changes in the Prime BEEF organizational structure?" must be answered.

Specific Research Problem

The research question for this study is: "What perceived shortcomings and expected improvements were involved in the three Prime BEEF realignment decisions?"

Investigative Questions

The investigative questions used in solving the management and research problems are:

1. Which AFCE leaders guided and developed the reconfiguration efforts?
2. What USAF issues and needs shaped the resulting Prime BEEF structures?
3. Do the three reorganizations, viewed in sequence, indicate progress or regress?

Methodology

The research for this thesis was designed to answer the investigative questions in three stages:

The first stage involved review of periodicals, theses, research reports, Air Force Institute of Technology (AFIT) curricula, and developmental reports/studies that were Prime BEEF-related; Wright-Patterson AFB libraries were investigated, as were pertinent courses in the AFIT/LS (Logistics) and AFIT/DE (Engineering and Services) schools. The bibliographies of these items were reviewed to identify other works of interest. These efforts were of particular value in pursuing answers to investigative questions 1 and 3.

The second stage involved telephone and mail contact, and travel to other USAF sources. The primary sources were the USAF Historical Research Center (HRC), Maxwell AFB, the Readiness Directorate (DEO) of the HQ Air Force Engineering and Services Center (AFESC), Tyndall AFB, and the Engineering Divisions and history offices of the various major commands. Each was asked to suggest and provide relevant data, and to offer suggestions for accessing other materials. From preliminary responses, it was decided that TDY (temporary duty) research at HRC was warranted. The visit to the research center proved to be of limited use. The HRC compiles and stores group and wing histories, useful for a wartime (Vietnam) study like Marlin's, which required access to detailed reports like those done for combat support group activities in Vietnam. No major combat support activities have taken place since the Vietnam conflict, and subsequent wing and group histories include only those support activities that substantially impact flying operations. Therefore, only select civil engineering operations and very few AFCE readiness or Prime BEEF initiatives are mentioned in post-Vietnam reports. The telephone and mail canvassing were useful in answering investigative questions 2 and 3.

The third stage involved an interview plan that was enacted after initial research. This sequence was followed so that knowledge gained from basic research could be used

in the interview format and performance. Information from interviews was useful, in turn, for further literature research and synthesis. The staffs of Headquarters (HQ) Air Force Logistics Command (AFLC) (located at Wright-Patterson AFB) Engineering Division (DE) and HQ AFESC/DEO were the initial interview candidates. Appendix F describes the interview methodology. The interview experience provided many answers to investigative questions 2 and 3, and helped to uncover information and opinions not readily available in literature.

Assumptions

It is assumed that individual accounts of past Prime BEEF operations in interviews, periodical articles, and theses are accurate and can facilitate responsible conclusions and recommendations. Because there are so few major studies of this subject, individual sources make up most of the data.

Scope

A large part of this organizational evaluation is based on the logistics of deploying Prime BEEF teams to war and the concepts of team integrity and preparedness when they arrive. Therefore, only CONUS mobility operations will be studied. Prime BEEF activity in theaters such as Europe or the Pacific will not be studied. While the troops there are Prime BEEF assets, they are not primarily mobile forces, and

do not utilize the same team concepts as CONUS forces. Information regarding operations of theater AFCE forces is present in the works cited earlier in this chapter.

Specialty engineering (construction management, site development) teams are an integral part of the combat engineering task, but their operations and technical development are not tied to that of BCE construction technique. In this thesis, their place in the administrative aspect of the reposturings will be highlighted, but no study of theory or operations will be undertaken. Firefighting team development will be treated in a similar manner. Capt Joseph Ballard's 1987 AFIT/LS thesis, An Organizational History of Air Force Fire Protection, concentrates on these issues from a fire protection perspective.

Constraints

The primary constraint in this thesis is the type of information on which the research is based. Combat capabilities, as affected by organizational structures and restructurings, are the principal basis for evaluation. No Prime BEEF structure, other than the original, has been used in combat (although Prime BEEF has deployed for contingencies such as the Pueblo incident). Therefore, evaluation of subsequent organizations will be based on their peacetime implementations, conceptual bases and theoretical uses.

Anticipated Results

The following propositions, based on a preliminary literature review (performed to assess this subject as a possible thesis topic), are presented as anticipated results of this research:

> Proposition 1: Prime BEEF structures have been realigned based on requirements of changing perceptions, by DOD leadership, of 'high threat' locations.
>
> Proposition 2: There have been conflicting desires, among AFCE leaders, for small unit interchangeability and large unit cohesion and team integrity.
>
> Proposition 3: There have been logistics, planning, and training implications in the reorganizations of Prime BEEF.
>
> Proposition 4: The capability of the Prime BEEF system has been enhanced through reconfiguration.

Summary

This chapter developed a brief history of four Prime BEEF organizational structures and three reorganizations from 1978 to 1987. Justification for research into this phenomenon, in terms of its perceived importance to AFCE management and its relationship to existing research, was presented. Questions which served to focus the basic dilemma, and its management, research, and investigative implications were introduced. The methodology, assumptions, scope, constraints, and anticipated results of the study were also explained.

II. Personnel, Combat, Technological, and International Issues

Overview

Many issues have influenced the Prime BEEF program's development, and many deployment capabilities have been affected by its evolution. Emerging technology and changing political and international situations have had substantial impacts in this process. Innovations in engineering equipment and processes, and the evolution of military threats, alliances, and capabilities have all affected the definition of AFCE warfighting posture. However, the most influential component has been and continues to be the individuals who make up the AFCE community. The 1964 AFCE introduction of the Prime BEEF system addressed job definition, career progression, and combat issues equally. The civil engineering (CE) community had experienced many problems with the dispersal and development of personnel for daily, peacetime use as well as for effective warfighting purposes. The definition of relevant, consistent personnel requirements was a prerequisite for the establishment of a realistic wartime work force; combat concerns have been developed since that initial effort.

The Original Prime BEEF Concept

To fulfill those prerequisite needs, the 1964 Project Prime BEEF study group had to quantify the numerous shortcomings and failures of the existing alignment.

The most obvious existing problems were:

> 1) engineering mobilization planning did not exist, as an established program; 2) AFCE base level units were not staffed or aligned with any consistency, from base to base; 3) Career progression was inadequate and inconsistent with respect to individual skills and skill levels (leading to disproportionate rank and manpower distributions among the required engineering functions) (34:5-6).

AFCE manning and skill level administration seriously degraded the quality of the work force; assessment of units on a comparison basis or of individual progress (technically or militarily) was nearly impossible without common standards or measures. The first step in improving the situation was to address the problems of individual tasks and skill levels, and related personnel distribution and career progression. Skills with no real combat relevance (painting, garbage collection) were removed from AFCE standard responsibilities, or were made additional duties to combat engineering functions. In-depth studies were pursued to establish the most essential combat engineering requirements, and to devise a manning scheme that would assign each possible wartime task the correct personnel strength, skill requirements, and rank and leadership positions. Inherent in this task was the need to provide

the answers to these questions: What were the basic combat engineering functions, what tasks could be combined as parts of individual functions, and what training and career progression plans would provide the necessary skills and leadership positions for each function?

As a result of the studies, these concepts were formed:

> 1) The following specialties were developed: a) missile facilities maintenance; b) electrical maintenance; c) electrical power production; d) mechanical maintenance; e) pavements maintenance; f) structural maintenance; g) site development; h) work control; i) fire protection. All wartime engineering tasks could be considered as being part of one these specialties.
>
> 2) A training program was developed such that each new airman was assigned a job that was part of one of the aforementioned specialties. The following numeric indicators (along with their skill level representation) were included in each AFCE member's AFSC (Air Force Specialty Code): a) 3-skill-level-"apprentice"; b) 5-skill-level- "specialist"; c) 7-skill-level- "technician"; d) 9-skill-level- "superintendent". All airmen were given the opportunity to achieve "superintendent" status in one of the basic specialties. Attainment of military rank was strongly linked to attainment of the progressive skill levels, thereby making military and technical leadership positions sufficient and equitably distributed (among individuals as well as specialty areas) (34:15-17).

Only after the basic manning problems had been worked out could the concept of a mobilization program, based on doctrinal and technical requirements, be addressed. The primary goal was to develop a program "to provide responsive, compact TDY Civil Engineering forces of specific military skills for support of short-term combat operations . . ." (34:7). Two types of Prime BEEF teams were developed

to aid base recovery and support during emergencies and contingencies. They were known as Base Engineering Emergency Teams (which provided attack or disaster recovery for the home base only) or Mobile Combat Support Teams (which deployed to overseas locations requiring contingency or combat support, usually with deploying flying units) (Marlin:21). There were four variations of the MCST: the Contingency Team (BEEF-C), the Flyaway Team (BEEF-F), the Missile Team (BEEF-M), and the Logistics and Support Team (BEEF-LS). The single BEET was designated the Recovery Team (BEEF-R).

The BEEF-R team was designed to provide the minimum military engineering unit, for support of base operations and maintenance during and after disasters or attacks. This support included work control, facility and aircraft fire protection, water supply and distribution, sewage collection and disposal, and heat production. It provided liquid fuels, electric power production and distribution, essential refrigeration, debris and snow removal, pavement and railroad repair, and structural damage control as well. The team had three different sizes and different roles: providing for sites or stations, small bases (less than 3000 persons), and large bases (greater than 3000 persons).

The BEEF-C teams provided services similar to those of the BEEF-R units, but only in support of R-teams that were taxed beyond their capabilities or locations without

military or AFCE resources. BEEF-F teams had a role similar to those of C-and R-units, but were dedicated to specified flying wings and their wartime destinations.

BEEF-M and BEEF-LS teams were somewhat less definitive in their taskings. M-units had individualized manpower groupings and skills suited to specific missile wing facilities, and provided engineering support to ready these facilities for launch. They had no defined responsibilities after launch, however, besides waiting for reassignment within the war effort. LS-teams had specialized roles as well, tending to the facility requirements of different AFLC bases. BEEF-LS teams did have a standard size (unlike M-teams) between that of a small and a large R-unit, presumably because most AFLC bases were large, but did not support a flying mission.

There was also a BEEF-E team, an engineering assistance team, added in 1971 for the purpose of executing Prime BEEF design, site selection, construction surveillance, and specialty studies (34:25).

The logistical requirements of deploying the newly developed teams and equipment were addressed by assigning a Unit Detail Listing (UDL) (later redesignated the Unit Type Code, or UTC) to each different grouping of personnel. This alphanumeric designator was one of the first steps in the automation of sending AFCE troops to war, as it allowed for a simplified designation of large groupings of airmen (BEEF-

C, -R, -F, and so on), for administrative and logistics purposes.

The international and technological requirements that led to the original Prime BEEF structure were numerous, and were apparent as early as the post-World War (WW) II/Korean War era.

AFCE aviation engineers established many basic concepts during the Korean War. Development of simple runway repair techniques, attempts to work within the Army controlled combat engineering structure, and the establishment of command, training, and equipment requirements were primary accomplishments. However, there was no established doctrine, plan of action, or anticipation of environmental conditions (45:132,135). Engineering technology development was limited during this conflict, but Col Guy Goddard's aviation engineer operational assessment of the Korean War did identify some areas for improvement:

1. Insure the aviation engineer equipment "keeps pace" with the equipment advances made in the civilian community.
2. Avoid multipurpose equipment. Keep it simple.
3. Standardize as much as possible.
4. Increase size and mobility without increasing generator requirements (45:165).

Inadequate responses by USAF engineering forces to real-world requirements in 1958 (threatened overthrow of Lebanon's democracy) and 1962 (Cuban Missile Crisis) illustrated combat readiness problems. During these

contingencies, the Air Force was tasked to provide the manpower and materials necessary to support American military response. These requirements and their impacts on daily air base operations are summarized in this 1977 Engineering and Services Quarterly passage:

> Consider the typical overseas base at the beginning of a major war scenario. The base immediately begins to receive large numbers of augmentation personnel and aircraft. . . . When large numbers of personnel and aircraft descend upon a base in a short period of time, extraordinary problems can arise. . . . People need places to sleep, food to eat, and hangars in which they can fix airplanes. Large numbers of arriving tactical aircraft and transient strategic airlift can quickly saturate all available parking ramp space. . . . It is the civil engineers who provide the emergency facilities (10:17).

In both situations, AFCE commanders' abilities to effectively assess their manpower shortcomings and access other AFCE personnel to compensate were inadequate. In the Lebanon action, only emergency contractor and Army resources could provide water and electrical requirements, while the Cuban Missile Crisis prompted a random, base-to-base collection of BCE personnel. Equally important considerations arose from the advance of Air Force weapons systems technology at this time. Post WW II aircraft, such as the F-86, C-124, and B-45, and new systems such as the Intercontinental Ballistic Missile (ICBM) and Distant Early Warning (DEW) line radar led to an increase in the requirement for technically advanced support facilities (45:153-154, 36:2).

Although the technical orientation of AFCE had been better defined by the initial Prime BEEF concept, actual combat requirements were not a part of the MCST or BEET taskings.

The CF-Team Concept

In the early 1970s, America's involvement in Vietnam came to an end and the Soviet nuclear threat diminished as a result of detente and the Strategic Arms Limitation Talks (SALT); U.S. war planners began to regard conventional war in Europe, involving the Soviet Union, as more likely (44:3-4). Theorists claimed that while combat in Vietnam was limited in its major damage (as inflicted by the North Vietnamese), any conflict involving NATO (North Atlantic Treaty Organization) and Eastern-Bloc countries was likely to result in repetitive, "blitzkrieg" type air attacks by Eastern-Bloc forces (37:3). Maj Robert Kreager describes this form of assault in his Air Command and Staff College (ACSC) research report:

> Soviet strategy in the European theater places emphasis upon surprise attack and the shock of continuous operations. . . . The Soviet strategy is concentration of mass, indirect firepower across and deep within NATO defenses (32:32).

RRR (Rapid Runway Repair) and BDR (Bomb Damage Repair), conceptualized in the early 1960s along with the new Prime BEEF program, took on added importance with this change in outlook. A definitive, prioritized approach to runway and strategic facilities restoration was necessary for recovery

operations, and offensive response, in the previously described European attack scenario. RRR, in particular, was the object of strong developmental efforts; a 1973-1974 AFESC initiative studied the shortcomings of the existing approach and expanded the program in response to the Soviet threat (4:22). The technical and fast-response requirements of these tasks caused the AFCE community to look for a more specialized, task-oriented personnel structure than the original Prime BEEF concept had been.

Maj Gen Gilbert believes that the introduction of the Contingency Force structure represented the first inclusion of technical requirements (AFSC-wartime task match, theater requirements, repair methodologies), moving away from the simply defined taskings of the original structure (23). The CF-team skill array provided expanded RRR supervision, equipment operation, and manpower combinations (46:9-10). According to Maj Max Day and Lt Col George Murphy, two readiness experts at AFESC in the late 1970s, many of these new RRR requirements resulted from the Joint Contingency Construction Requirements Study (JCCRS) that addressed engineering technical and personnel requirements subsequent to the Vietnam conflict (11:18). The new structure, introduced in 1979, was made up of six Contingency Force Teams designed to deploy independently or in various combinations.

The CF-1 team was the nucleus of Rapid Runway Repair, and deployed independently if the only requirement was that of horizontal repair (RRR). The team consisted of one officer and 21 pavements specialists and heavy equipment operators, and could be combined with the more diversified CF-2 team, with four officers and 66 specialists, if vertical repair (facility BDR) was a necessity. The CF-1 and CF-2 teams could be combined with the CF-3 team, made up of two officers and 33 enlisted men (experts in construction management and work control) to create a complete BCE unit. CF-4 was a specialty team comprised of select AFCE management experts (15 officers and 5 non-commissioned officers (NCO)) that could fulfill theater requirements for command, numbered air force, or Air Force Regional Civil Engineer (AFRCE) engineering staffs. The firefighting and crash rescue responsibilities of AFCE were fulfilled by the CF-5 and CF-6 teams, a 12-person unit of firefighting specialists and a three-person squad of senior fire suppression command and control NCOs, respectively.

Despite the improvements realized by the CF structure, the Prime BEEF program apparently still had many problems. Many CONUS personnel were still untasked for wartime roles (more than 4000 AFCE individuals), BCE personnel skills did not match wartime taskings called for in contingency plans, and the problem of inconsistent unit manning had reemerged (5:35, 45:265). Additionally, new RRR equipment, more

varied theater requirements (Southwest Asia in particular), and more technically advanced RRR techniques had created the need for new personnel skills and an even more flexible organization (37:3-4).

The PB-Team Concept

Response to the changing international situation in the early 1980s rendered CF capabilities insufficient. The Iranian hostage affair, along with other unsettling developments, pointed to a need for USAF deployment capability in Southwest Asia (48). This belief was supported by 1981 Engineering & Services Quarterly articles; Lt Col John Pelleck outlined the USAF role in protecting friendly oil producing nations in Southwest Asia and Lt Gen Philip Gast detailed AFCE's part in this endeavor, one of providing expeditionary logistic support installations (38:9, 22:11). Few established installations existed in this part of the world, creating a USAF need for cantonment (bare base establishment) capability. This new requirement of the Prime BEEF system was not provided by the European theater and RRR/BDR intensive CF structure.

In 1984, the Prime BEEF teams were introduced. The PB-team structure was the first one to establish the concept of "core" and "non-core" teams, those teams that contained the skills essential for basic wartime operations (RRR, BDR) and those that did not (specialty, augmentation needs). The PB-2, -3, and -4 teams were "core" teams and provided basically

the same capabilities of the CF-1, -2, and -3 teams. Augmenting the "core" teams, if needed, were the "non-core" PB-1 and PB-8 through -28 teams. PB-5 was a designation reserved for future needs, and PB-6 and -7 were the equivalents of the old CF-6 and -5 firefighting teams, respectively. Lt Col Ashdown's ACSC report describes the various PB-teams:

> PB-1 Engineer Management Team. This 15[sic]-man team would provide BCE management staff at collocated operating bases (COBs) or large bare bases. It would also provide middle-management augmentation at main operating bases (MOBs). CONUS BCEs and their senior NCOs, including their First Sergeant, would be assigned to this team. . . .
>
> PB-2 Basic Support Team. This 45-man team would provide a full range of engineering specialties as an additive support package at large theater bases or would provide complete support capability at small Harvest Eagle beddown locations. . . . These teams would also augment the PB-4 for supplemented RRR operations. . . . Multiples of these teams would be assigned to theater locations based on projected workloads.
>
> PB-3 Limited Support Team. This smaller 20-man team also provides a range of specialties but at a generally lower skill level. They would augment the management and basic support teams for beddown, repair, and Operations and Maintenance (O&M) tasks. . . .
>
> PB-4 RRR Equipment Operator Team. This 12-man team provides pavements and equipment operator personnel as heavy equipment operators for beddown, repair, and Operations and Maintenance (O&M) tasks. . . .
>
> PB-6, PB-7, and PB-8 Fire Protection Management, Operations, and Limited Operations Team. The existing fire protection teams have been renamed PB-7 and -6, respectively, to fit in with the new team structure. The 3-man PB-8 team was added for tasking and posturing flexibility. . . .

PB-9 to PB-26 Specialty Teams. To allow most of the existing engineering authorizations to be assigned to teams, 3-man specialty teams were developed for each AFSC. . . . These teams would augment PB-2 and -3 teams or be combined with other specialty teams to meet unique mission requirements (3:76).

In addition, there were S-1 Staff Augmentation Teams and S-3 Regional Wartime Construction Manager Teams, for special theater engineering needs.

This new structure featured three distinct advantages over the CF structure:

1. Best match of Prime BEEF forces against projected wartime requirements at specific sites.
2. Adaptable to various RRR concepts.
3. More wartime-critical engineering personnel assigned to mobility teams, and all with an exact match in their specialty area (37:11).

PB-teams, with their highly diversified skill groupings, provided a vehicle for implementation of much of the new technology of the early 1980s. Evolving RRR technology (polymer resin and fiberglass mat repair of major craters) was to supplant the labor intensive aluminum mat technique and make workers available for various technical construction skills (this has not yet occurred) (48). Development of 20 new RRR heavy equipment pieces and the prefabricated, self-contained Harvest Bare/Harvest Eagle bare base facilities created many new AFCE AFSCs for equipment operators and utilities specialists (5:34, 3:76).

While the PB structure addressed many of the needs that resulted from new technology and destinations, many problems with logistics, planning, and team integrity and cohesion arose. The need for a more self-contained, less diverse approach became apparent.

The CS-Team Concept

Introduced in 1987, the CS concept has as its primary unit the 200-person squadron, which deploys with a specified flying wing to its wartime location. The AFESC CS-team implementation guidebook TIGER (Team Integrity Generates Engineer Readiness) describes this unit:

> CS-1 Engineer Active Duty Combat Support Squadron. This 200-person squadron will provide rapid runway repairs; force beddown (bare base) using expedient facilities and utilities during contingencies; emergency and follow-on war damage repairs; command, control, and communications of wartime operations; and contract management of war damage repair operations. This squadron will support aircraft operations at main operating bases (MOBs), collocated operating bases (COBs), forward operating bases (FOLs), and bare bases (BB). Generally, only one of these squadrons will be assigned to provide continuous wartime operations in low threat areas. However, in high threat areas where multiple attacks are anticipated, a second squadron will be required to provide a double shift, around-the-clock wartime capability (1:C-1-C-2).

The CS-1 squadron consists of CONUS BCE personnel. The 200-person unit will be provided by a single BCE squadron, if that squadron has sufficient peacetime manning. Squadrons that are not large enough to field a CS-1 team will deploy as a team that has either 150, 100, or 50 persons, whichever

appropriate. These teams are known as CS-2, -3, and -4, respectively, and represent different blocks of AFSCs which are added together to comprise the standard 200-man squadron that deploys with a designated flying wing. CONUS units which have more than enough manpower to field a single CS-team may also be tasked to provide the additional CS-team(s) that they can staff to help build additional CS-1 teams. Air National Guard and Air Force Reserve units are aligned according to the same concept, with their designations as CS-5, -6, -7, and -8 teams analogous to the active duty CS-1, -2, -3, and -4 teams. The designations for the firefighting teams, PB-6, -7, and -8 (PB-8 is the firefighting "non-core" team), remain unchanged at this time.

The "core" and "non-core" tasking concept has been retained in the CS structure, with 59 of the 200 persons in the squadron regarded as "core" requirements. The distinction is significant in that there is leeway in matching peacetime AFSCs with wartime requirements for "non-core" personnel, while there is none for "core" taskings (as was true in the PB concept). "Non-core" individuals may also be tasked to be proficient in skills other than their primary AFSCs, while "core" AFSCs will be filled by highly trained, one-task workers. The final teams defined in the new team structure are the staff augmentation teams, S-1 (for theater command use) and S-2 (for theater numbered air

force use), and the S-3 Regional Wartime Construction Management Team. These teams provide engineering specialties in much the manner as the BEEF-E, CF-4, PB-1, and PB S-1 and S-3 teams did previously.

Prime BEEF technology continues to grow in the areas of RRR equipment, methods, and employment of new air base protection concepts. MSgt Edward Greer, HQ AFLC/DEMO (Readiness Branch), believes that AFCE is better equipped to execute its combat tasks than ever before (26). New RRR methods such as the use of pre-cast concrete slabs, as well as the numerous new equipment types that have emerged (screed beams for levelling crater fill and slab transport and placement devices) can be accommodated by the introduction of the CS-teams and the flexible "non-core" personnel grouping (for developing tasking and training concepts).

This diversity will also aid the refinement of air base protection programs such as Air Base Survivability and Operability (ABSO) and Base Recovery After Attack (BRAAT), in which pre-attack, post-attack, and multi-squadron (Explosive Ordnance Disposal, Disaster Preparedness, Medical, Services, BCE) actions are combined. MSgt Greer also believes that continuing development of minimum operating base infrastructures throughout the world will lessen the bare base requirements as perceived in the early 1980s, perhaps streamlining the cantonment procedure and

accommodating a more flexible posture for international deployment (26). The cantonment issue in many densely populated areas, such as Western Europe, is streamlined out of necessity; there is often insufficient real estate to provide bare base areas, so the standard USAFE (United States Air Forces, Europe) approach, in the event of war, is to modify base housing, base gymnasiums, and dependent schools for troop billets and emergency facilities (50).

As AFCE progresses with the implementation of the CS concept, it must heed the international and technological trends of modern combat. Maj Gen George Ellis, current Director of USAF Engineering and Services, offers this insight:

> The same technological advances in offensive weapons, communications, and transportation that reduced the size of the globe have increased the physical size of the conventional battlefield . . . we have become dangerously accustomed to conducting the air war from unmolested air bases. . . . The overall result of these compelling realities is that the . . . lethality and accuracy of new conventional weapons, and the political attraction of conventional war demand a new focus on basing support systems (19:8).

The Combat Support teams have been postured to address both the technological needs ("core/non-core" approach) and the psychological requirements (team cohesion, integrity) of this volatile combat environment.

Summary

This chapter traced the evolution of the Prime BEEF program through the four different organizational structures

that it has postured. The personnel issues that have influenced this process, as well as the international, technological, and warfighting developments, were viewed as both causes and results of each of the reconfiguration occurrences. The newest concept, the Combat Support Teams, has strong possibilities for effectively addressing these areas.

III. Historical Implications

Overview

Major General William Gilbert, director of the CF-team implementation, believes that the reposturings are a direct result of technological development. Although the casual observer might dismiss the various realignments as products of the presiding AFCE administrations' personal agendas, such a situation is unlikely. Reassessment of the existing structure's capabilities and thorough study of international and combat requirements clearly illustrate the requirement (or lack thereof) to reorganize forces (23). Maj Gen Clifton Wright, USAF (Retired), who implemented the second Prime BEEF reconfiguration, has a concurrent belief that each posturing of personnel had as its roots the current technological and political issues (48). Maj Gen George Ellis, director of the current reorganization, has strong feelings about the AFCE responsibility to respond to today's rapidly shifting international and technology concerns (see preceding page). While these opinions seem reasonable, a more detailed study of the origins and outcomes of the reconfigurations is warranted; implications of the deployment concepts are evident in program implementations, combat operations, doctrine, and logistics.

Mobile Combat Support Teams

Proliferation of the nuclear threat in the 1960s, with the Soviet Union as the chief adversary, may suggest an AFCE orientation toward CONUS missile operations and air base recovery at that time (40:7). The only defined taskings of the original Prime BEEF program were those of the BEET BEEF-M teams, charged with local missile wing engineering requirements, and the BEET BEEF-R teams, designated for large scale restoration of their own CONUS bases. These assignments indicate an attentiveness to the offensive and defensive requirements of a nuclear missile exchange, respectively. MCST BEEF-F teams were charged with the support of their allied flying wing, at its deployment location, but in the 1968 publication of AFR 85-22, The Prime BEEF Program, even this role is subordinate to the unit's home base needs; the regulation states that BEEF-F and -C team manning will not be changed except when their installation no longer requires a particular AFSC (16:5).

However, this lack of definitive international taskings may have doomed the prospect of effective use of the Prime BEEF structure throughout the Vietnam conflict. Focused efforts in specific areas like plumbing or electricity were not well served by the diversely skilled MCST teams, postured for the well-rounded needs of a typical Air Force base (34:59). In Vietnam, Army engineers fulfilled the more thorough responsibilities, such as construction of bare

bases (minimum field encampments) (45:258). Most AFCE efforts were made on established air bases, in the areas of security and support facilities; revetments, blast deflectors, simple building types, and airfield improvements were predominant (34:36). The air base repair activities were minimal, as well; North Vietnamese mortar and rocket attacks required only quick set resins and concretes to mend surface runway damage (4:21).

Deployments of Mobile Combat Support Teams were beset with personnel problems as well. Many deployments of CONUS personnel took place in the form of small (20-25 man) specialty squads or larger, diverse units hand picked from as many as 17 different bases (34:32). During the conflict, there was no attempt to change the essentially unused MCST team definitions or the basic doctrine of Prime BEEF. The first regulation that addressed Prime BEEF policy, AFR 85-22, did so in this passage from the 1968 edition:

> The number of BEEF military manpower spaces authorized in a civil engineering unit will be the number necessary to meet combat support, training, career development, rotation base, and stable assignment requirements and will not exceed recognized functional manpower requirements (16:1).

The attention paid to the non-combat issues in this policy statement may have resulted from the newness of integrating wartime taskings into day-to-day AFCE operations.

Few operational assessments of the Vietnam war impacted AFCE as strongly as the Joint Contingency Construction

Requirements Study (JCCRS) of 1976-77. This study originated from the office of the Joint Chiefs of Staff (JCS), and addressed the requirements for post-Vietnam AFCE requirements. Relatively few mobility (MCST) taskings (only 19 percent of Prime BEEF personnel) and the ongoing bid for control of USAF combat engineering support, between the Army and Air Force, were at issue (34:26, 45:250-251). These situations, which could have resulted in a JCCRS proposal of AFCE manning reductions (if few taskings and Army control were deemed appropriate by the JCCRS), were underlying reasons behind the 1979 reconstruction of Prime BEEF forces into the CF structure (17). Col Joe Hicks, Chief of HQ AFLC/DEM (Operations and Maintenance Division), believes that a post-Vietnam reduction of AFCE personnel based on the JCCRS issues would have caused the cutback of senior officers and NCOs in staff functions without defined wartime roles. He believes that a vast body of military perspective and experience would be lost if senior members of engineering training, education, planning, and readiness staffs were reduced (28). This manpower threat may very well have encouraged AFCE to define new wartime scenarios in Europe and Korea and new technical wartime responsibilities such as rapid runway repair and bomb damage repair, resulting in increased airman and officer mobility positions (35).

Contingency Force Teams

Revision of technical requirements, to support progress such as the new RRR methods, is instrumental in maintaining readiness. However, the addition of new requirements to an established personnel system can cause a mismatch between taskings and capabilities (35). The MCST concept did not quite fit the new, post-JCCRS Prime BEEF taskings, leading to definition of the CF-teams. This team structure accommodated both peacetime engineering needs and wartime requirements, by creating a BCE unit standard for combat deployment and employment of CF-teams. The MCST teams had been individualized (tailored to the requirements of their home bases) in their organization, perhaps an extension of their original role as a tool for establishing base personnel requirements; it was difficult to perceive the wartime utility of their existences. Although the CF approach showed more combat orientation than the previous MCST concept, it also showed a reluctance to tailor AFCE manning directly to the anticipated wartime scenario (43:12). Subsequent to the first organizational reconfiguration, when the CF structure was introduced, the 1982 edition of AFR 93-3 (the newly designated version of AFR 85-22) contained this description:

> Prime BEEF teams are postured in a manner to best meet our wartime needs while recognizing that base civil engineering manpower, mission, and workloads vary from location to location. Civil engineering manning standards are based on peacetime needs. The civil engineering wartime

> requirements call for a much different mix of civil engineering skills than exists for peacetime (12:5).

It appears, from this passage, that AFCE had at least delineated the difference between providing for peacetime and wartime requirements. As combat taskings became more technically defined in the early 1980s, however, an even greater degree of detail in AFCE role description was pursued.

Prime BEEF Teams

Based on the personnel, technical, and international requirements outlined in the preceding chapter, the Prime BEEF Team concept was introduced in 1984. The PB structure did benefit from, and also facilitate, the proliferation of computerized personnel tracking. Posturing the highly detailed PB specialty teams was an understandable reaction to such new, powerful personnel administration capabilities. This concept appears to have had a doctrinal impact, as well; when AFR 93-3 was rewritten in 1984 to coincide with the reorganization into PB-teams, the regulation took this approach:

> Prime BEEF teams members are postured to meet essential wartime requirements within engineering functional areas for rapid, short-notice wartime deployments. . . . In contingency or exercise operations, Prime BEEF duties take precedence over peacetime nonemergency duties and any additional or augmentation duties (13:6).

Colonel Warren Dickerson, chief of AFESC/DEO (and Chief of the CS concept developmental team TIGER (Team Integrity

Generates Engineer Readiness)) believes that the PB structure, along with the development of more fully defined taskings and destinations, did indeed address wartime requirements more fully than peacetime needs (17). The large volume of CONUS airmen and their AFSCs could be catalogued more efficiently, which allowed USAF planners to more easily pinpoint the Prime BEEF teams to be used at specific theater locations.

However, implementation of the PB concept was beset by many problems as well. Despite their influence in the PB-teams' development, many advanced RRR methods (polymer resins, large scale use of quick set concretes) have yet to be refined. This is an example of research and development concepts that may be too esoteric for true implementation (48). The Harvest Bare and Eagle equipment has a very limited, perhaps inadequate inventory, leading to restricted availability and resultant training problems (45:259).

As cited in the 1985 Moe and Waggoner thesis, AFCE leaders Generals Wright, Ellis, and Ahearn (Gen Ellis' Deputy Director after he assumed directorship) reportedly had reservations about the Prime BEEF system, even with the newly implemented PB-teams (45:266).

Serious problems surfaced in logistics, planning, and team integrity, as well. Additionally, a program introduced in the early 1980s, Project Warrior, sought to elevate USAF members' appreciation of their roles as combatants in

pursuit of the Air Force mission, to fly, fight, and win. It is difficult to imagine how the AFCE community helped personnel cultivate an image as part of a warrior group, when the CF and PB concepts moved increasingly toward defining individual, mobile technicians. Another perceived problem was a lack of the long since abandoned Prime BEEF-flying unit relationship, a potentially strong representation of the integrated combat unit. It appears that AFCE leaders took note of these issues, as a new Prime BEEF team structure, incorporating both of these ideals, was introduced in 1987.

Combat Support Teams

The prospect of wartime situations which require organic engineering squadron support in USAF flying operations would seemingly require a very strong sense of purpose and preparation. Integral in these concepts is the idea that deployable units must know who their counterparts in combat are going to be, what their manning and tasking will be, and what their destinations and the conditions of those destinations will be. Maj Gen Ellis is quoted by Col Edward Smith in the Air Force Journal of Logistics:

> There are serious functional and organizational disconnects. The combat support group as a deployable combat support element is mythology. Key combat support elements do not report in peacetime to the . . . commander nor do they practice deploying and employing as a combat support task force . . . base communications, ground transportation, and combat medicine are not

> [even] organizational parts of the combat support structure (42:12).

General Ellis expands on this point in his own Military Engineer article:

> We must demand comprehensive and brutally realistic training for our support forces. The solution is to organize during peacetime as required by the wartime scenario, train as organic units, and deploy as fully capable combat engineering squadrons (18:18).

The TIGER publication combines the ideals of Maj Gen Ellis and the CS-team concept:

> Civil engineering CS forces will be properly organized, equipped, and trained for mobility and survivability. . . . In these desperate times, high morale can make the difference between success and failure. It is cultivated by good leadership, discipline, comradeship, esprit de corps, and devotion to the unit. . . . In the final analysis it will be these qualities, and not so much the numbers of engineers and special pieces of equipment, that will count (1:12).

CMSgt Carroll Hamilton, HQ AFLC/DEMO, believes that there is a better centralization of technical skills in the new CS-team structure, which allows for a more versatile, multi-skilled body of workers to exist in a peripheral support role. The "core/non-core" differentiation of CS personnel provides an organization well prepared for an AFCE role that is once again strongly tied to the flying mission; the modern air base requires a consistent, well-rounded operations and maintenance effort (27). MSgt Greer, also a DEMO specialist, believes that this situation has resulted in a better integrated AFCE combat support approach, in which war damage repair of existing bases and bare base

establishment are treated equitably; perhaps the RRR oriented CF structure and the cantonment intensive PB-teams have been reconciled in the CS concept (26).

Even the combat and peacetime requirements divergence has seemingly moved closer to resolution; AFM 1-10, Combat Support Doctrine, was introduced in 1985, for the purpose of clarifying the wartime focus of all combat support activities. It illustrates the wartime/peacetime interface:

> Combat support is both a peacetime and wartime activity. . . . at the forward edge of the battlefield . . . throughout the combat theatre . . . to the national industrial base and . . . international sources . . . (15:1-1-1-2).

Logistics

Limited resources can inhibit combat efforts, which makes the uninterrupted supply of manpower and materials a necessity. This process is known as logistics. Logistics has been defined at various times as "the practical art of moving armies," and "the art and science of moving armies and keeping them supplied" (2:2). Air Force Journal of Logistics describes the USAF application of this program:

> Air Force logistics supports the buildup, readiness, and operations of combat forces, including strategic and tactical mobility; determines what resources are needed; procures, transports, stores, allocates, and maintains these resources to make the forces efficient and effective (24:24).

The first operational logistics evaluation of Prime BEEF activity came in studies of the system's use in Vietnam. Capt Ron Marlin's 1987 AFIT/LS thesis noted the

problems associated with vehicle and equipment-dependent Prime BEEF activities. He recommended a force structure that would minimize this dependence and therefore reduce the unhealthy, adversarial competition among AFCE units for these resources during wartime shortages (34:61). These problems in Southeast Asia led to concerns about the inflexibility and overly simple task definition of USAF deployment capabilities, which may have contributed to the move from MCST to CF-teams.

The CF-teams defined RRR and BDR taskings and equipment needs and wartime destinations more accurately than the MCST program, which likely made it easier to apportion resources accurately and flexibly. The introduction of the Contingency Force concept coincided with the early stages of development of a computer-based USAF logistics plan; COMPES (Contingency Operation/Mobility Planning and Execution System) and its logistics planning software LOGMOD-B (Logistics Module-Base Level) were implemented in 1981. The system was designed to streamline decision making and planning involved in the logistics efforts to move USAF manpower and material to wartime destinations. These concepts would seem particularly applicable in light of the AFCE problems in Vietnam regarding manpower distribution and the ever changing criteria involved in war planning efforts. The COMPES was introduced in 1981, the approximate midpoint

in time between the introductions of the CF-Team and PB-Team structures.

In response to various international, technical, and reporting requirements impacting on Prime BEEF operations, AFCE introduced the PB structure in 1984. While this organizational reconfiguration apparently improved manning flexibility and accuracy of wartime task definition, the effect on logistics planning was negative. The TPFDL (Time Phased Force Deployment Listing), the preliminary listing of manpower and equipment resources that forms the base of COMPES logistics plans, grew to previously unanticipated proportions with the diversified, detailed PB structure. The number of line items in the TPFDL expanded from approximately 3,000 to nearly 12,000 (25). The Major Command DCSs (Deputy Chiefs of Staff) for engineering, many of whom had pressed for the PB-Team introduction for technical and manning benefits, were less than happy with the increased planning and logistics considerations that the structure imposed on AFCE and USAF wartime taskings (35). One of the primary purposes behind the present reconfiguration into the CS-Team Prime BEEF Structure was to alleviate these problems. The single 200-man squadron, for logistics purposes, is easier to support than the multitude of "core" teams and "non-core" specialty units that the PB system may have combined to deploy a similar group. The

TIGER CS-Team implementation guide describes the improvement effort:

> Theater mobility requirements were being satisfied in terms of 3-person specialty teams. The 3-person specialty teams were a managerial nightmare creating considerable discontent both in the field and at headquarters levels. . . . As a result, HQ AFESC was tasked to take a fresh look at wartime manning and refine both theater and CONUS requirements. If warranted, HQ AFESC would pursue necessary changes to procedures, programs, and policies that would maximize blue suiter support for theater requirements (1:3-4).

While the CS structure still must address the logistical and planning challenges of combining various CS-2, -3, -4, -6, -7, and -8 teams, most often postured by differing BCE units, improvement on the PB approach is apparent. The unit type code (the alphanumeric designator of TPFDL supply and personnel groupings) is a single identifier for each CS-team (up to 200 persons), as opposed to the single designation for each PB-team (potentially a 3-person team).

The changing international and technological (to include logistics) pressures on the Prime BEEF system will continue as long as there is an AFCE initiative to go to war. These issues may vary in scope as well as make-up, but effective combat response can be realized only with understanding and proper application of logistics concerns. AFM 1-10 describes such a process:

> Combat support is the art and science of creating and sustaining combat capability. Combat support originates with the acquisition of raw materials, people and information, transforms them into

> aerospace systems, and continues with the employment of these systems in war (15:1-1-1-2).

Summary

This chapter detailed the implications of each of the Prime BEEF concepts, and their roles in creating and resolving problems related to various combat issues. The reconfiguration efforts, and the resultant team structures, were reviewed in terms of their effects on competition for resources (during peacetime and wartime), the efforts to best apply AFCE personnel and technology bases to the changing international community, and the logistics of deploying Prime BEEF teams to war.

IV. Team Integrity, Planning, Training, and Reporting Impacts

Overview

The original Prime BEEF structure was forced into frequent variations to adapt to Southeast Asia's unique requirements, almost as a rule, as this account of partial use of a BEEF-C team in Vietnam describes:

> The use of an entire Prime BEEF-C team would have been inappropriate because the task did not require 60 men. This fragmentary use of BEEF teams would become the standard practice of the Prime BEEF program. It is unclear from the published literature why Prime BEEF teams were not reduced in size given this frequent use of fragmentary teams. One explanation may be that in a major conflict, such as World War II, these team sizes would be appropriate for supporting flying units in an intercontinental conflict. Facility damage repairs in a full-fledged war would require the skill diversity and size of a 60-man Prime BEEF team. In most instances, probably more than one team would be needed. Again, one could also argue that it is easier to scale down forces for specialized requirements than to combine a multitude of small forces when faced with a major conflict (34:30).

In this Vietnam scenario, team unity and integrity were sacrificed (34:60). Important factors, such as technical familiarity and friendly support between team members, were lost when composite teams were formed from different units. This problem was compounded by the fact that workers often came from different cultural backgrounds, physical environments, and training systems and were even supported by different logistics networks. Col Henry Stehling (HQ

Pacific Air Forces (PACAF) DCS for Civil Engineering during the Vietnam conflict) made particular note of AFCE shortcomings in his end-of-tour reports. He cited a lack of flexibility in AFCE management with regard to changing international, economic, and environmental conditions, adding that prior contingency support programming (planning) was a possible area for improvement (45:252). Equipment dependent procedures and competition for resources were areas of concern as well (34:61-62). As these accounts illustrate, team structure, logistics, team integrity, planning, and training are integral in AFCE's capability to perform in wartime.

Team Integrity

Many opinions have been formulated regarding the effects of Prime BEEF reposturings on the integrity of the AFCE unit as a cohesive force. This concept is not addressed as a primary issue in the original structure, although the idea of aligning BEEF-M and BEEF-F teams with missile and flying wings may indicate that a certain degree of importance was placed on such unit alliance. The labeling of teams as large base, small base, and site units, although an obvious functional measure, may also have been an effort to cultivate the identity of such specialized responsibilities. Consistency in alliances, labels, and personnel creates a basis for unit integrity and cohesion.

The introduction of the "building block" style teams, in the CF structure, afforded AFCE a system of components that combined for a definitive wartime unit. However, this system applied to the peacetime BCE manning only as far as these building blocks could be applied to a BCE unit's daily operations and maintenance needs. This was the first time that wartime units (designated for use in overseas locations) were delineated as a separate set of entities from the CONUS squadrons that comprised them. Although a BCE squadron's CF-teams might be deployed together to fulfill a wartime requirement, the needs of theater locations would likely combine the contents of two or more CONUS squads, placing team integrity and cohesion in question.

This phenomenon was expanded in the PB structure; "building blocks" as small as the 3-person specialty teams were introduced, leading to an unprecedented ability to mix specialties from different locations to satisfy wartime taskings. The aforementioned Vietnam evaluation was the first operational measure of the impact of this concept. Although difficulties with team unity were encountered in CF-era exercises such as Bright Star '83, this problem was attributable to the use of hand-picked individuals (for specialized skill requirements, perhaps an omen of the PB-teams to come) as well as to combination of CS "building block" teams (29). PB-teams provided technical proficiency,

but the lack of team identity that resulted from the multitude of small units may have hurt AFCE capability; comradeship, esprit de corps, and unit devotion can spawn the courage and drive that must accompany technical skills (1:15). The switch from the numerous small PB-teams to the "team integrity" influenced 200-person CS-squads is a study in contrast, as the larger, consistent teams have been reintroduced, but their mobilization still calls for integration of "building blocks" (to include AFRES and ANG teams). Lt Col Gerald McMahon, HQ AFRES/DEOP (Planning Division), believes that although AFCE has matched individual CONUS squadrons to 200-person overseas requirements, the combination of 50, 100, and 150-person CS-teams to fulfill other mobility requirements is not altogether different than the preceding approaches; he believes that Prime BEEF will not reach true team integrity until the 200-person unit is standard for peacetime work as well as training and combat (35).

Assistant DCS for HQ AFLC Engineering, Col James Zody, believes that the impact of conflicting command and functional concerns will always cause unity problems, regardless of team structure and its strengths. Many theatre AFCE commanders, who know the local requirements best, are O-5s (Lt Col) and many arriving commanders are O-6s (Col) and would assume command regardless of functional implications. Individuals forced to serve under commanders

other than those of their home units may suffer from cohesion problems within the new command structure. Therefore, internal team integrity of USAF AFCE units is but one hurdle to effectiveness (50). Col Zody also points to the tenuous nature of high team cohesion and unity, as the deploying unit's final purpose may be one of attrition backfill and assimilation into various types and sizes of units.

Bare base and minimum operating base operations may be good examples of requirements for team integrity and self sufficiency, but these taskings are only a portion of the total overseas AFCE responsibility; the effort applied to creating and maintaining cohesion should be tempered by the fact that the combat scenario may require its disassembly for integration into other units (50). Col Hicks, HQ AFLC/DEM, believes that possible command conflicts may have been better served by the PB structure; the small PB-teams were most often led by company grade officers (Capt and below) or NCOs, who would fit into the congested command structure easier than a colonel leading a 200-person unit (28). Despite these reminders that unit integrity and cohesion may not always be possible, or decisive factors, their impact must be assessed and acted upon.

Planning

Planning efforts, in anticipation of mobilization and warfighting requirements, require the synthesis of large

amounts of information. This information can take the form of intelligence gathering (of likely situations and destinations), application of the mobilization system (Prime BEEF), and assessment of each particular unit's part in the overall system application (unit fitness for their part of the plan: cohesion, training status, and so on). The degree to which these information types are combined and applied successfully is dependent on the planning capabilities of the Prime BEEF structure. The original Prime BEEF concept was developed to deploy as part of USAF war plans that included only "notional" taskings of support units; theater requirements described basic support requirements for overseas locations, but did not detail exact base requirements or individual units to provide for them (10:15). Capt Walter R. Davis, in a 1977 Engineering and Services Quarterly article, describes possible improvements in the soon to be implemented CF structure:

> Once the reposturing is complete, we will have achieved a greatly enhanced state of Readiness to support the Air Force mission. . . . Virtually every military engineer will have a specific wartime task that calls for essentially the same skills that he employs in his peacetime job. The support forces required in most of our war plans are "notionally tasked". . . . If specific tasking were used, however, each Prime BEEF team would know exactly what its deployment possibilities were. . . . The teams could then tailor their training and equipment to match their contingency tasks (10:15).

Subsequent to the CF-team implementation, a 1981 Air Force Journal of Logistics article detailed the AFCE role in USAF

operational planning:

> The third step in plan development is support planning . . . service components determine support requirements and time-phasing needed to meet projected consumption rates. . . . This time-phasing is crucial: resupply must be timely to insure continued combat capability, and transportation requirements must compete with forces for limited transportation assets. . . . The fourth step in plan development is civil engineering . . . support planning. . . . This step includes identification of requirements for base facilities and, collaterally, civil engineering personnel, equipment, and materiel needed to support the plan (33:16).

It appears that the CF structure did not satisfy all of the planning needs as detailed in the preceding passage, at least in the amount of detail desired and available with growing computer technology. The realignment into the PB-team configuration was based in part on planning ideals, as outlined by Maj (now Lt Col) Bittner in a 1985 article:

> Through computer analysis, theater planners can now pinpoint their wartime planning needs by AFSC at each deployment location based upon projected force beddown, damage repair, and O&M requirements. The deployment planners should be able to identify Prime BEEF teams that closely resemble theater manning requirements, but under the old CF-team structure this was unlikely (5:34).

Maj Bittner then went on to make note of several improvements of small PB specialty teams over the large CF "building block" teams: better fulfillment of unique skill requirements, ease of use in training exercises, and better peacetime-wartime role match for individuals (5:35). The PB-team structure was applicable to a larger number of

contingency types and locales, but with the logistics problems that resulted, this capability was challenged. Major Generals Gilbert and Wright believe that the desire to pursue such diverse responsibilities needs to be held in check (23, 48). Maj Gen Gilbert believes that AFCE should have only one primary planning goal (most likely function or destination) at a time, with only minor diversions; attempting to prepare for too many possibilities will dilute resources and diminish chances of success in the most likely scenario (23). Maj Gen Wright supports continuing assessment of planning expectations, as they often outgrow the logistics, manpower, and training capabilities of the communities they service (48). These concepts are represented to a large degree in the AFESC planning strategy behind the new CS-team structure:

> All civil engineering skills are essential for accomplishment of the wartime mission. If all wartime tasks were listed in random sequence, it would be difficult, if not impossible, to prioritize them to everyone's satisfaction. Especially with the infinite number of battle scenarios that could occur (1:6).

The AFESC CS-team implementation guide goes on to describe the new Prime BEEF contingency response philosophy of "core" and "non-core" personnel posturing; the BCE unit is assigned a UTC, indicating its wartime assignment (50, 100, 150, or 200-person team or combinations thereof), in which there are critical ("core") and essential ("non-core") personnel. Critical personnel are those individuals identified to

accomplish only the most vital tasks (RRR and essential facilities BDR), and are carefully chosen to provide the exact skills and skill levels required. "Non-core" individuals are those personnel skilled in essential areas, but assigned wartime tasks that may not exactly match their peacetime jobs, and are thus considered multi-skilled or attrition filler, capable of being trained on the spot and supervised by "core" specialists. The "core" personnel have absolute AFSC requirements, but the "non-core" airmen can be postured against loosely fitting AFSC taskings. The theater destinations of the teams, a source of uncertainty in the past, have been more fully defined with the concept of assigning CS-teams to flying wings, who traditionally have known their wartime areas of responsibility.

The developments in CS-team posturing have resulted in both more definite (flying wing alignment) and more flexible ("non-core" personnel) planning capability for AFCE forces, one that needs properly trained personnel for successful implementation.

Training

The ability to train realistically, efficiently, and consistently is an important determinant in the ultimate success of planning, logistics, and integrity efforts. The original Prime BEEF program, with its limited definition of taskings, employed a minimally defined training plan. The introduction of training guidelines did not take place until

1967, three years after the program was introduced, when the 93-series Prime BEEF regulations were introduced; BEET-teams were prescribed a training regimen that consisted of base recovery exercises, while the MCST-units began training for a variety of mobilization and wartime operations (31:12-13). The initial program for mobile teams included the following training areas:

1. Weapons training
2. Military sanitation training
3. Government vehicle training
4. Field training (security, AM-2 matting, airfield revetment, Harvest Eagle equipment) (31:13-14).

With the introduction of the CF-teams in 1978, more specific wartime tasks, along with their technological bases, were introduced. This expanded tasking led to further development of the training concepts that had been introduced in 1967. Expedient methods (field engineering), explosive ordnance reconnaissance, and comprehensive RRR training resulted (31:14-15). The 1978 reorganization also marked the first overall AFCE concept (published in handbook form by AFESC) for a unit training program, although this directive was (and remains today) only a statement of topics to be instructed, and not a methodology.

In their 1980 AFIT/LS thesis, Captains Kohlhaas and Williams found the CF-team training program and its application at base level to be inadequate; realism,

prioritization of training areas, and time and resources afforded unit training were all found to be lacking (31:99). A telling trend was the hesitancy of units to spend the great amount of time and money necessary for the more involved training areas (such as RRR and chemical warfare) (37:20).

The introduction of the PB-team structure in 1984 coincided with the new AFESC technical training program at Detachment (Det) 2, Eglin AFB, providing for the technical training needs of greater team flexibility and new theaters of operations (to include Southwest Asia) (37:20). A 1985 AFIT/LS thesis, studying the training program under the new PB-team concept, showed that Air Force-wide Prime BEEF members perceived improvement in the general prioritization of and time spent on training (37:122-124). However, the author voiced concern about a pervasive lack of understanding of the overall guidance of AFR 93-3 (the primary regulation addressing the Prime BEEF program), the degree to which home station training programs were consistent throughout AFCE, and program realism; the average BCE squadron member was undecided about what constituted adequate levels of hands-on training and classroom training (37:124-125). This uncertainty may have reflected the manning approach to the principal field training method, the bivouac (overnight field exercise). As mentioned earlier, the high cost and time-consuming nature of the more

involved, difficult training types can be factors in decisions to pursue or delay training initiatives. This is especially true when training reduces manpower and funding available for daily operations. The new CS structure was developed with these problems in mind.

The bivouac scenario can be developed in three ways: 1) use of BCE squadron Prime BEEF personnel in command or Air Force deployments (for actual, non-military emergencies or for purely training purposes), 2) home station exercises, or 3) scheduled deployments to the AFESC technical training course at AFESC Det 2. Although major deployments sometimes use large numbers of a single unit's personnel, care is taken in AFESC manning decisions to minimize the impact on single BCE units' daily operations (21:23). However, in the event of squadron deployment and employment for such purposes, the 1987 revision of AFR 93-3 takes care to preserve unit integrity for CS-teams, to maximize any contingency training value that may exist; assimilation into the host BCE unit and accomplishment of routine base operations and maintenance is discouraged (14:25). The present requirements for home station overnight bivouac and Det 2 attendance are once yearly and once each 36 months, respectively (14:29). The use of single UTCs for each CS-team insures that realistic CS-team deployments to Det 2 or to home station field conditions will at least provide a semblance of unit integrity and continuity. If unit

commanders take minimal care to deploy true wartime UTCs, the resulting training effort will almost assuredly provide more consistent benefits than past deployments of PB-teams; the combinations of the large "core" PB-teams and numerous "non-core" 3-person specialty teams for training purposes were virtually un-reproducible from deployment to deployment. In addition, AFESC has sought to expand the technical training of CS-teams with regional equipment training and home station RRR training programs. These initiatives involve the construction of RRR equipment training sites in three primary regions of the United States, and establishment of thorough RRR training at each Prime BEEF team's home base. These programs will lighten the burden of the only recurring equipment training site at Det 2, and will make unit training more effective with less travel and cost.

The new CS structure has brought with it many training implications, both programmatic (equipment training) and affective (team cohesion and continuity). These effects have strengthened the relationship between successful Prime BEEF operations and successful training.

Reporting

The method by which Prime BEEF administrators report their forces' readiness to higher headquarters is of great importance in Air Force decisions to employ those forces, should those decisions become necessary. Training methods,

team integrity, and USAF/AFCE planning designed to take advantage of these concepts are all integral parts of the overall degree of unit warfighting readiness that must be assessed and reported periodically.

Reporting the readiness of Prime BEEF troops during the initial stages of the program took on a decidedly non-combat character. As noted in Chapter II, the system was designed to establish a personnel structure that would later accommodate the development of a combat capability over time. The reporting actions from Prime BEEF's inception until 1968 centered more on the progress of its implementation and effects on personnel issues than its possibilities as a warfighting tool. The 1968 version of AFR 85-22 describes the Prime BEEF Reporting, Analysis, and Status system (BRASS) as a method of depicting the status of program implementation, career development and training, and unit personnel make-up (16:7).

1964 DOD policy mandated wartime readiness reporting capability, for all U.S. forces, should planners require it. Despite that directive, it was not until 1968 that USAF introduced the Air Force Status and Identity Report system (FORSTAT) as a means for assessing combat capability. However, only combat units were required to report and combat support units were still without a measure of their warfighting abilities. Many problems, such as

nonstandardization and inaccuracy, were encountered in 10 years of FORSTAT use.

In 1979, an attempt to remedy the existing problems and expand the reporting program resulted in a new method, the Unit Status and Identity Report (UNITREP) system (41:2). UNITREP afforded AFCE its first opportunity to assess and report combat preparedness, as "combat support and combat service support units were given the option of reporting" (6:34). AFESC leaders were quick to recognize an opportunity to both improve the AFCE readiness posture and gain more visibility for combat support as an integral part of USAF war plans (6:34-35). The timing of the UNITREP introduction was important as well; the technological expansion of RRR and the importance placed on the task by the new, RRR-oriented CF structure made a strong, technical measurement of unit RRR skills a logical requirement.

The UNITREP system allowed the BCE squadron to review their strengths in personnel, training, support equipment and supplies, and combat essential equipment (only if the CONUS unit was deployed with combat equipment, which they ordinarily would not have) (41:4). These areas of measure were evaluated by percentages; the amount of those resources that the unit possessed divided by the amount required for the unit's wartime tasking was the standard. Percentages were then rated on a combat readiness scale of C-1 to C-5 (a "C-rating" meaning "combat readiness"). C-1 meant "fully

meant "fully combat ready" (all required levels of resources satisfied), C-2 stood for "substantially combat ready" (minor deficiencies), C-3 was "marginally combat ready" (major deficiencies), and a C-4 rating indicated "not combat ready" or that the unit's shortcomings precluded their ability to perform (41:5). C-5 was a rating reserved for units that were "service programmed, not combat ready", meaning that their tasking was being redefined or re-equipped, and the action was not complete to allow combat readiness. Generally, the lowest C-rating in any single area served as the overall squadron rating, as this situation would likely constrain the other areas of unit performance; however, if the unit commander thought this not to be the case, such negative effects could be discounted and the squadron could be rated accordingly.

The initial use of the UNITREP system was not without difficulties; a 1981 revision addressed several implementation problems. The issues that affected training and CONUS personnel distribution (lack of standardization, primarily) at this time caused distorted C-ratings. Different bases had widely diverse percentages of their authorized personnel levels, and readiness officers used the number of persons provided to their unit as a measure of their number of prepared and trained individuals. To be an accurate measure of a squadron's ability to fulfill warplan taskings, the basis of evaluation should have been the

unit's combat manpower requirements, not just those persons currently on the unit roster; this solution became a requirement in the revision. Also addressed was the idea of free substitution, of persons with incompatible AFSCs, for the purpose of calling a team position "filled" (perhaps the beginning of the substitution rules for "core" and "non-core" teams). One final issue was the propensity of AFCE leaders to view the C-ratings as measures of squadron, program, or commander worthiness, when they often simply illustrated the personnel and financial resources that the unit was allotted (6:35). The 1984 introduction of the PB structure represented an opportunity for squadrons to enjoy a consistently higher C-rating.

The many new AFSCs and representation of all the unit skills on 3-person teams, along with the introduction of some leeway in posturing personnel on the "non-core" teams, relaxed the constraints (and lower ratings) imposed by the AFSC substitution rules and somewhat smaller body of AFSCs in the CF-teams. As mentioned earlier, AFCE leaders and unit commanders had many reasons for supporting the new PB structure (especially the improved C-rating utility), but the confusion of the numerous small teams led to reconfiguration in 1987. The implementation of the CS concept has not appreciably altered the nature of the reporting system, although some changes have been made in its administration. The system has been renamed Status of

Resources and Training system (SORTS), and the terminology of the team status was changed from "combat readiness" to "category level" in order to eliminate "evaluative terminology formerly associated with the system" (and perhaps the perception of ratings as indicators of BCE and readiness staff worthiness) (41:11). The C-1 to C-5 definitions have not changed in meaning. Squadron readiness is now evaluated in a two-tier fashion, with the primary C-rating being applied to the "core" personnel grouping, and the secondary measure applying to the less restrictive manning of "non-core" positions (1:11).

The methods of reporting Prime BEEF warfighting readiness have been refined through the years, into a detailed, thorough system, reflecting the evolution of the Prime BEEF concept itself. A more complete study of AFCE reporting can be found in AFR 55-15, Unit Combat Readiness Reporting.

Summary

This chapter developed the premise that Prime BEEF team integrity, planning, training, and reporting have been synthesized and developed to an unprecedented degree of completeness, allowing considerable opportunity for system evaluation and improvement.

V. Evaluation

Overview

Investigative questions and anticipated results were developed as a result of strong preliminary efforts, at the outset of this thesis, to understand and prepare for the research task. A productive methodology, reasonable schedule, and responsible scope of work were necessarily defined by both of these guiding concepts. They were refined through the sequential process of posturing a basic AFCE dilemma (introduction), and the pursuance of the resulting management and research problem statements (Chapter I), and will now be used to evaluate and summarize the data presented in Chapters II, III, and IV.

Investigative Questions

A summary of the conclusions that the investigative questions led to is as follows:

1. Which AFCE leaders guided and developed the reconfiguration efforts?

The first reconfiguration, moving from the original Prime BEEF concept to the Contingency Force structure, was directed by Maj Gen William Gilbert, then the Director of USAF Engineering and Services. Two prominent members of the AFESC Readiness Group staff, Maj Max Day and Lt Col George Murphy, played important roles in the implementation and

development of this "building block" concept of mobilization.

The second reorganization, which replaced The CF concept with the Prime BEEF team standard, was presided over by Maj Gen Clifton Wright, who succeeded Maj Gen Gilbert as director. General Wright was assisted by his Chief of Operations, Readiness Division, AFESC, Maj Robert Bittner. Maj Bittner developed and oversaw installation of the detailed PB-team structure.

The third, and ongoing, reposturing was initiated by Maj Gen George Ellis, present Director of USAF Engineering and Services. Colonel Warren Dickerson, current Chief of the AFESC Readiness Directorate, was the chief of the developmental "TIGER (Team Integrity Generates Engineer Readiness)" team that developed the present Combat Support team concept.

2. What USAF issues and needs shaped the resulting Prime BEEF structures?

The CF-team concept was a direct result of the perceived need for a more definitive wartime task definition for AFCE. The "building block" style teams allowed a more diverse approach to posturing troops, making it possible to pursue specialized efforts in RRR or BDR, or more generic responsibilities such as air base establishment and upkeep. This capability was pursued in response to the newly expanded wartime engineering concepts (RRR/BDR), as well as the changing nature of perceived international threats, in

the 1970s. This plan was a successful step in the AFCE effort to more fully develop a combat doctrine and deployment and employment methodologies.

The PB-team structure took the concept of detailed combat roles for AFCE one step further, by meticulously posturing even individual engineering skills. This tactic was of use in maintaining currency with increasingly sophisticated engineering technology and responding to the growing, varied sphere of USAF international responsibility in the mid-1980s. Although the actual implementation and use of this system met with difficulty, it did represent an ambitious effort, on the part of AFCE, to be ready to respond to the plethora of modern combat engineering requirements.

The newest program, the CS-team approach, has backtracked slightly with respect to the level of detail in posturing. While this approach may appear to reduce the AFCE capability to respond to varying situations, a seemingly important distinction has been made; a less-detailed, but more well rounded and cohesive unit may very well be more psychologically prepared for the unknown or unexpected and thus a more effective warfighting unit than one that is more technically postured, but fragmented. Response to unique requirements in warplan scenarios could require deviation from the standardized CS methodology, but the new structure has offered a compromise between the

support provided by team cohesion (large, standard units and "non-core" versatility) and skill specialization ("core" personnel).

3. Do the three reorganizations, viewed in sequence, indicate progress or regress?

The CS-team program is a culmination of the evolutionary process of Prime BEEF program development. It has sought to further refine the technical and destination capabilities of deployment of AFCE combat personnel. In hindsight, it is clear that the CF concept did not go far enough in solving certain problems, such as untasked airmen, skill dispersal and standardization, and wartime/peacetime AFSC matches. Likewise, it can be postulated that the PB-team solutions to these issues did not fully anticipate the effects of acute specialization of troops on various warfighting concepts. However, the Combat Support proposal appears to have treated all of these areas, by making use of several aspects of past organizational structures. The reintroduction of squadron-size teams was an attempt to solve problems with the overly divisive PB-teams, and the use of "core" and "non-core" teams in this approach apparently affords the capability to perform specific or generic tasks. While planning, training, and logistics have been served by a more cohesive unit concept, specialty needs in critical tasks have been addressed, allowing for varying requirements of technical and international requirements to be pursued effectively.

Anticipated Results

The anticipated results, first proposed in Chapter I, can be used to evaluate the body of this thesis in much the same manner that the investigative questions were used.

> Proposition 1: Prime BEEF structures have been realigned based on requirements of changing perceptions, by DOD leadership, of 'high threat' locations.

The first reorganization, introducing the CF structure, retained the Soviet Union as the primary subject of threat analysis, but viewed that country's probable target of opportunity as the European theatre, introducing the concept of localized conventional conflict. This contrasted with the concern over possible intercontinental, nuclear exchange with the U.S.S.R. that had shaped AFCE posturing previously. The 1984 *reconfiguration* into PB-teams was based largely on the appreciation of the socioeconomic implications and unique physical requirements of possible conflict involving the oil producing nations of the Middle East (Southwest Asia). While the CS-team structure does not respond to any appreciable change in expected locations, the overriding concern appears to be that likely USAF destinations, as well as the types of conflict and combat to be encountered, are too diverse to be treated with technical or political posturings designed for narrowly defined zones. The psychological and logistical needs of AFCE troops have been provided for by a large, cohesive unit that encourages ease of acclimation and supply support.

Proposition 2: There have been conflicting desires, among various AFCE leaders, for small unit interchangeability and large unit cohesion and team integrity.

The original Prime BEEF MCST and BEET units were comprised solely of individual BCE squadrons' everyday manning. A high degree of familiarity and esprit de corps among workers was possible, but the large squadron size teams were postured for home base maintenance or recovery, not technical specialization or indigenous demands. CF-teams were designed primarily to remedy this situation, as the European theatre, conventional warfare threat called for smaller specialty teams to concentrate on the RRR and BDR requirements of such a scenario. The "building block" approach to CF-team integration could be executed to create a specialized unit or a complete BCE squadron. However, due to the multitude of bases (and tasks) that units could both originate from and travel to, the likelihood of BCE squadrons remaining together through the employment process was diminished. This situation must have been acceptable to those individuals that developed the PB structure; the introduction of 18 different 3-person specialty units all but did away with the concept of deploying an entire CONUS team to a theatre location. The degree of unit interchangeability virtually guaranteed a precise application of required skills to any technical situation, however. The utility of this capability to respond to all situations is a key concept in assessing the reintroduction

of the large (200-person) standard of the Combat Support program. RRR and BDR orientation of CS-teams is still achieved through the "core" personnel grouping, but most other pre-attack and post-attack activities are now completed with multi-skilled "non-core" individuals whose hallmarks as a group are constancy, cohesion, and versatility.

> Proposition 3: There have been logistics, planning, and training implications in the reorganizations of Prime BEEF.

The logistics, planning, and training requirements of preparing Prime BEEF troops for war are strongly influenced by the current views of likely destinations and team size significance. It is apparent that the use of large, consistent team formats has made Prime BEEF planning and logistics efforts simpler and more efficient. The move to specialization and individualization of AFCE efforts quite naturally made these efforts more involved, consuming more time and resources. The utility of this situation, given that scenarios are shifting more rapidly and conflicts can be expected to proceed and escalate at a faster rate than ever before (due to growing weapons technology), is questionable. Training programs have been affected in a converse manner; technical specialization allowed training efforts to concentrate on smaller curricula and personnel groups, while the return to the unit integrity of a 200-person squad has created an emphasis on the group mechanics

of warfighting. Emphasis on multi-skilled individuals, the psychology of large scale personnel interaction, and organizational and doctrinal identity has resulted in expanded training requirements, greater cost, and more involved planning efforts. However, the CS-1 team's "core" specialists can expediently train and supervise the "non-core" augmentees for immediate wartime needs; diverse specialty training, such as the PB-teams called for, has been reduced.

> Proposition 4: The capability of the Prime BEEF system has been enhanced through reconfiguration.

Each reconfiguration has been beneficial in that a more definite commitment to the combat responsibilities of AFCE has resulted, as evidenced by doctrinal changes. Although wartime tasking and peacetime engineering responsibilities have competed for resources in the past (a situation that may have been exacerbated by the specialization of wartime roles and their lack of distinction from peacetime technician roles) the CS concept is based on a strong warfighting definition. The newest structure allows for the specialized needs prominemt in CF- and PB-team taskings ("core") while encouraging the group identity that was part of the original Prime BEEF program ("non-core").

Summary

This chapter evaluated the data that was collected and presented in the thesis effort. Investigative questions,

the controlling factors in the research process, were reviewed along with the conclusions that their use facilitated. The anticipated results of the research, formulated at the outset of the work, were studied to establish their degree of accuracy, based on the amount of support contained in the data.

VI. Future Implications

Overview

This chapter addresses the relationships between the conclusions reached in the thesis evaluation (Chapter V) and possible trends that may affect the development of AFCE doctrine and identity in the future. Individual opinions, gathered through the literature review and interview processes, are the bases of these potential directions. Chapter VI will also present an overall thesis summary, in a study of the apparent solutions reached through reconfiguration, those issues which may be unresolved, and concepts that are still evolving. Recommendations for future study of this topic, and viewpoints of AFCE professionals who were asked to review, critique, and expand upon the thesis content will be examined.

Future AFCE Trends and Measures

The Prime BEEF program may take many different directions in the future. The present emphasis on team integrity and simplified logistics and planning might prove to be the answer to modern AFCE combat requirements; a reversal of leadership opinion could cause a renewed accent on technology and specialization; perhaps future events will dictate a combination of the two or a departure from both. One thing is certain: The abundance of theories regarding

warfighting of the future and the speed at which technology is advancing, in combination, make flexibility a required asset.

The introduction of the Combat Support program is a phased approach. It includes the "revolutionary" process of reconfiguration, to be followed by the "evolutionary" development of equipment, construction, and combat training (29). Besides the utility value of the "non-core" personnel grouping, this diverse collection of airmen plays an important role in maintaining adaptability to new technology and training concepts; in the increasing attempts to posture the technically "perfect" team for each definitive task (with the CF and PB structures), very little room was provided for change. Col George Romero, Director of HQ AFRES Engineering, believes that AFCE now has the capability to respond to organizational shortcomings and changing technology with training initiatives; Col Romero's Chief of Planning, Lt Col Gerald McMahon, concurs: if AFCE had achieved the level of sophistication inherent in the CS-teams' multi-role capabilities (as opposed to preoccupation with very few methodologies or destinations in earlier ideologies), previous reorganizations may not have been necessary (39, 35).

The importance of flexibility in the Prime BEEF program is underscored by the specific developments in many USAF doctrine and planning initiatives. AFM 1-10, Combat

Support Doctrine, revised in 1987, supports the need for flexibility:

> The next war may not resemble past wars. Technological advances can overpower tradition and create new and unanticipated environments. . . . Therefore, a flexible combat support structure is elastic, modular . . . expanding and contracting . . . designed to be taken apart and quickly reassembled to form new capabilities (15:3-5).

Maj David Cannan, in his 1984 ACSC report, described a 21st century basing concept that would likely alter the AFCE approach to peacetime and combat engineering; there would be a few Main Support Bases (MSB) (with full base infrastructures) in a given region which would provide the large scale aircraft maintenance, repair, and supply functions. Properly prepared weapons systems would use somewhat smaller, less developed Operating Bases (OB) (more, in number, than MSBs) for maintaining alert status and initiating operations, and would then use numerous Dispersed Operating Locations (DOL) (similar to today's bare bases) for sustained operations and front-line combat (8:viii). Col Robert Wiswell's concept for basing composite flying wings (counterair, interdiction, close air support aircraft combined at one supporting base) is designed to take the integrated combat unit one step further, improving dispersal and the logistics of operations integration (47:11). This idea may well be compatible with Maj Cannan's MSB proposal. These recommendations are supported by a host of other beliefs: The inherent vulnerability of basing systems (air

bases) is the limiting factor in the projection of aerospace power; technology has increased the accuracy, range, and power of weapons targeted against today's large, stationary, intricate air bases to the point of making them obsolete; dispersal, mobility, and self-sufficiency is an answer (30:45, 19:9, 42:9).

While the CS concept has provided an outlet for evolutionary response to USAF change, it has yet to address the fact that there is no prescribed readiness stance for immediate specialty needs to which the PB-teams catered. Although the 1987 revision of AFR 93-3 suggests that squadrons posture their untasked personnel into teams (PB-XX) that will be used to expedite backfill and replacement efforts for their tasked CS-teams, it does not elaborate. Lt Col Bittner, Holloman AFB BCE, has a novel approach to this use of untasked personnel: those individuals not assigned to his CS-1 team are organized into small "shop" teams that not only are available for individual backfill, but also represent a realistic alternative to the undefined procedure of dismantling CS-teams for specific requirements (7). The addition of this standard to the Combat Support program would provide several benefits: improved timeliness and preparedness for specialized response, an official position in the squadron wartime task for every eligible member, and expanded definition of the multi-skilled "non-core" personnel group, for augmentation purposes.

Thesis Summary

This thesis illustrates the concept that varying external factors (technology, politics, doctrine) have greatly affected the perceptions, among AFCE leaders, of the capability of Prime BEEF forces to respond to contingency or combat situations. These changing perceptions have precipitated action to change wartime engineering capabilities; the result has been three separate reconfigurations since 1978. The reorganization process, at the present stage, has resulted in both strong opinions and tenuous positions regarding the traditional issues of readiness posturing. For the time being, team integrity and unit cohesion are particularly important assets in Prime BEEF deployment. While all possible wartime scenarios are not served by team integrity, the cohesion and diversity of the CS-teams is an important tool in preparing for the uncertainty of today's war and the evolution of tomorrow's technology. The CS-1 standard is a large-scale, consistent posture that has simplified (and improved) logistics and planning operations, both problem areas in the past. The "building block" CS-2, -3, and -4 teams are both reminders of and solutions to the fact that all BCE squadrons can not support war plans equally; until AFCE units become entirely combat oriented, the peacetime engineering requirements of differing air bases will cause manning and readiness inconsistencies.

The concerns that appear resolved by the CS Program may in fact change and require further clarification, while those that seem uncertain may be reconciled by international and technological developments. However, the reconfiguration efforts of the past have not yet served such changing conditions for more than four years. With an alternative approach such as the "evolutionary" capability of the CS program, a thorough test of that capability (along with an abstinence from reconfiguration) is warranted.

If the readers of this document can understand the origins of the current posture, perhaps they can employ the organizational capacities in successful everyday Prime BEEF operations. When unsuccessful initiatives occur, it is hoped that this same understanding will encourage use of the Combat Support concept's potential to adapt and evolve; using the knowledge gained from the many reorganizations would seemingly be more effective than simply reconfiguring again. AFCE leadership has previously discarded and reacquired various capabilities, but now may be able to satisfy all combat requirements with organizational fine tuning.

The combined contents of this thesis and Capt Marlin's work represent a complete picture of Prime BEEF history from its inception to the present day. Most subtopics covered in this report have been treated with complete theses, and the only operational use of Prime BEEF, in Vietnam, was studied

in detail by Marlin. The most promising area for future research would be an analysis of any system improvements that may occur. Possible reasons for such action would be the inclusion of concepts such as Lt Col Bittner's "shop team" idea, or the response to results of a major USAF exercise like Salty Demo '85.

Confirmation of Findings

Four individuals were asked to review a draft copy of the completed thesis, and to offer their opinions on the accuracy and implications of the content. Those responding were Col John Zody, Assistant DCS, HQ AFLC Engineering; Col Joe Hicks, Chief of HQ AFLC Operations and Maintenance Division; SMSgt Woodrow Wilson, 2750 CES Readiness NCO; and Mr. Gary Kendall, 2750 CES Readiness Technician.

There were no questions or disagreements directed toward the thesis text, but the individuals performing the review did have strong opinions regarding the future of the Prime BEEF program.

Col Hicks was primarily concerned with the status of the remaining conflicts and uncertainties (backfill vs. self-sufficiency, varying destinations). It is his belief that these tensions have existed throughout the efforts to posture technically "perfect" teams, and can not be eliminated when preparing for the countless possible wartime scenarios. He hopes that the apparent recognition of this belief, in the Combat Support methodology, will not be

overshadowed by future AFCE leaders' preoccupation with theaters and technologies in which they have been specialists.

Col Zody has a similar outlook. He believes that future AFCE ideology and operations will be formulated in response to events as they occur, an approach facilitated by the shift from technology prescriptions to diversity and adaptation. Col Zody sees this shift as an affirmation of the importance of quality leadership and personnel, and an indicator that AFCE may have to be prepared for numerous low-intensity combat situations, as opposed to the few large-scale scenarios envisioned previously.

SMSgt Wilson agrees that the Combat Support program's "evolutionary" capability is an important tool for responding to future wartime requirements, but he also believes that use of this simple device can not alone produce such results. In his opinion, the reorganizations of the past were abrupt responses to changing requirements only, with no guidelines to shape the organizational and ideological revisions. He would like to see a strong AFCE doctrine, not tied to USAF flying doctrine, to present wartime engineering in terms of national interests, goals, and objectives. SMSgt Wilson views this proposed doctrine as the most promising addition to the CS concept, to best implement and expand upon present capabilities.

Mr. Kendall's interest is in practical, rather than theoretical, roles of the new organization. He perceives a trend in which the CE career field is being used as a solution to requested or directed career changes of mid-level NCOs. He believes that many of these individuals are not technically qualified or properly prepared as leaders to fulfill Prime BEEF mobility roles. This belief is particularly troublesome if one subscribes to Col Zody's view of the importance of personnel quality. Mr. Kendall also views wartime engineering, a combat support activity often performed in a combat environment, as a possible issue in America's dilemma regarding the use of women in combat. Women are currently postured in combat support functions, but not in combat roles.

Summary

This chapter was a theoretical and ideological extension of the issues studied in this thesis. The conclusions reached in Chapter V were reviewed in light of those future USAF and AFCE trends that are possible and perhaps applicable in future Prime BEEF readiness efforts. A discussion of the Prime BEEF program's present state, the practical implications of the thesis' findings for program development, and recommended future study of related topics were included. Additionally, AFCE professionals commented on thesis findings and presented topics that they thought relevant.

Appendix A: Standard Prime BEEF Teams Since Program Inception

Original Concept

Base Engineer Emergency Team (BEET)

BEEF-R: Recovery Team

Mobile Combat Support Teams (MCST)

BEEF-F: Flyaway Team
BEEF-C: Contingency Team

Contingency Force (CF) Team Concept

CF-1: Prime BEEF Recovery and Operations Equipment Team
CF-2: Prime BEEF Recovery and Operations Support Team
CF-3: Prime BEEF Recovery and Operations Augmentation Team
CF-4: Prime BEEF Command Staff Augmentation Team
CF-5: Prime BEEF Crash Rescue and Fire Suppression Operations Team
CF-6: Prime BEEF Crash Rescue and Fire Suppression Control Team

Prime BEEF (PB) Team Concept

PB-1: Engineer Management Team
PB-2: Basic Support Team
PB-3: Limited Support Team
PB-4: RRR Equipment Operator Team
PB-6: Fire Protection Management Team
PB-7: Fire Protection Operations Team
PB-8: Limited Fire Protection Operations Team
PB-9: Specialty Officer Team
PB-10: Specialty Engineering Assistant Team
PB-11: Specialty Production Control Team
PB-12: Specialty Interior Electric Team
PB-13: Specialty Exterior Electric Team
PB-14: Specialty Power Production Team
PB-15: Specialty Refrigeration Team
PB-16: Specialty Liquid Fuels Team
PB-17: Specialty Heating Team
PB-18: Specialty Controls Team
PB-19: Specialty Pavements Team

Prime BEEF (PB) Team Concept (ctd.)

PB-20: Specialty Equipment Operations Team
PB-21: Specialty Structures Team
PB-22: Specialty Mason Team
PB-23: Specialty Metals Team
PB-24: Specialty Plumbing Team
PB-25: Specialty Entomology Team
PB-26: Specialty Environmental Team

Combat Support (CS) Team Concept

CS-1: Prime BEEF Combat Support Squadron (200-person)
CS-2: Prime BEEF Combat Support Squadron (150-person)*
CS-3: Prime BEEF Combat Support Squadron (100-person)**
CS-4: Prime BEEF Combat Support Squadron (50-person)*
PB-6: Prime BEEF Fire Protection Management Team
PB-7: Prime BEEF Fire Protection Operations Team
PB-8: Prime BEEF Limited Fire Protection Operations Team

*One CS-2 and one CS-4 combine to form a CS-1 standard team.
**Two CS-3 teams combine to form a CS-1 standard team.

Appendix B: BEET/MCST Detailed Manning Chart (36:3)

Title	AFSC	BEET BEEF-R Large	BEET BEEF-R Small	BEET BEEF-R Site	MCST BEEF F&C
Base Civil Engineer	5526	2	1		
Construction Engineer	5534	1	1		2
Maintenance Engineer	5544	1	2	1	
Industrial Engineer	5574	1	1		
Sqd Commander	7024	1	1		
First Sgt	01090	1	1		
Admin Supv	70270	1	1		
Admin Spec	70250	2	1	1	
Work Control	556XX	4	3	2	1
Supply	646XX	2	1		
Real Prop	554XX	3	2	1	1
Site Devlp	553XX	3	3	2	2
Electrician	542XX	6	3	1	2
Line Men	542XX	4	3	2	2
Refr/AC	545XX	5	3	1	2
Liquid Fuels	546XX	4	4		2
Heat	547XX	8	4	2	3
Pavements	551XX	12	6		4
Equ Ops	551XX	10	6	2	4
Carpentry	552XX	7	5	2	4
Masonry	552XX	3	2		2
Paint	552XX	4	3	1	1
Plumbing	552XX	10	6	3	4
Metal	532XX	3	2		1
Mechanic	555XX	4	2		2
Power Prod	543XX	7	5	5	4
Refr/AC Plant	545XXA	2	1	1	
Heat Plant	547XXA	5	2	2	1
Water/Waste	563XX	10	6	1	4
Entomology	566XX	2	2	1	2
Fire Prot	571XX	38	20	2	10
Total		166	103	33	60

Appendix C: CF-Team Detailed Manning Chart (12:35)

	No.	AFSC	Specialty
CF-1			
	1	5525C	CE Officer
	4	55130	Pavements Apprentice
	6	55131	Equip Ops Apprentice
	2	55150	Pavements Specialist
	4	55151	Equip Ops
	1	55170	Pavements Technician
	1	55171	Equip Ops Technician
	1	55191	Pavements/Equip Ops Superintendent
	1	55370	Eng Assistant Technician
	21		
CF-2			
	2	5516	CE Staff Officer
	2	5525	CE Officer
	1	54230	Apprentice Electrician
	1	54231	Apprentice Lineman
	2	54232	Apprentice Power Prod
	1	5XX00	CE Manager
	2	54250	Electrician
	2	54251	Lineman Specialist
	3	54252	Power Prod Specialist
	1	54270	Electrical Technician
	1	54271	Lineman Technician
	1	54272	Power Prod Technician
	1	54530	Apprentice Refrig
	1	54550	Refrig Specialist
	1	54570	Refrig Technician
	1	54551	Liqu Fuels Specialist
	1	54571	Liqu Fuels Technician
	2	54532	Apprentice Heat
	2	54552	Heat Specialist
	1	54572	Heat Technician
	2	54533	Controls Specialist
	1	55130	Apprentice Pavements
	1	55150	Pavements Specialist
	1	55151	Equip Ops
	4	55230	Apprentice Carpentry
	1	55231	Apprentice Masonry
	2	55232	Apprentice Metals
	2	55235	Apprentice Plumbing
	2	55250	Carpentry Specialist
	2	55251	Masonry Specialist
	2	55252	Metals Specialist
	3	55255	Plumbing Specialist
	1	55273	Structural Technician

	No.	AFSC	Specialty
CF-2 (ctd.)			
	1	55275	Plumbing Technician
	1	55330	Apprentice Eng Assistant
	1	55350	Eng Assistant Specialist
	1	55370	Eng Assistant Technician
	1	55530	Prod Control Specialist
	3	55570	Prod Control Technician
	2	56631	Apprentice Env Support
	1	56650	Pest Mgt Specialist
	3	56651	Env Support Specialist
	1	56671	Env Support Technician
	1	64550	Inventory Mgt Specialist
	1	70250	Admin Specialist
	70		
CF-3			
	1	5516	CE Staff Officer
	1	5525	CE Officer
	1	10090	First Sgt
	1	54230	Apprentice Electrician
	1	54231	Apprentice Lineman
	1	54232	Apprentice Power Prod
	1	54250	Electrician
	1	54252	Power Prod Specialist
	1	54299	Electrical Superintendent
	2	54530	Apprentice Refrig
	1	54551	Liqu Fuels Specialist
	1	54532	Apprentice Heat
	1	54552	Heat Specialist
	1	54533	Controls Specialist
	1	54599	Mechanical Superintendent
	2	55230	Apprentice Carpentry
	1	55250	Carpentry Specialist
	1	55231	Apprentice Masonry
	1	55235	Apprentice Plumbing
	1	55252	Metals Specialist
	1	55299	Structural Superintendent
	1	55350	Eng Assistant Specialist
	1	55390	Eng Assistant Superintendent
	1	55570	Prod Control Technician
	1	55590	Prod Control Superintendent
	1	56670	Pest Mgt Technician
	1	56699	Sanitation Superintendent
	1	64530	Apprentice Inventory Mgt
	1	64550	Inventory Mgt Specialist
	1	64570	Inventory Mgt Technician
	2	70230	Apprentice Admin
	1	70250	Admin Specialist
	35		

	No.	AFSC	Specialty
CF-4			
	8	5516	CE Staff Officer
	7	5525	CE Officer
	1	54299	Electr Superintendent
	1	55390	Eng Assistant Superintendent
	1	57100	Fire Prot Mgr
	1	55500	Prod Control Mgr
	1	70250	Admin Specialist
	20		
CF-5			
	4	57130	Apprentice Fire Prot
	7	57150	Fire Prot Specialist
	1	57170	Fire Prot Supv
	12		
CF-6			
	2	57170	Fire Prot Supv
	1	57190	Fire Prot Superintendent
	3		

Appendix D: PB-Team Detailed Manning Chart (13:46)

	No.	AFSC	Specialty
PB-1*			
	1	5516	CE Lt Col
	1	5525E	Electrical Engineer Capt
	1	5525F	Mechanical Engineer Lt
	1	55590	Prod Control
	1	55530	Prod Control
	1	55390	Engineer Assistant
	1	54599	Mechanical Superintendent
	1	55199	Pavements Superintendent
	1	56699	Sanitation Superintendent
	1	100x0	First Sgt*
	1	751x2	Unit Training Mgr*
	1	6455X	Supply*
	1	70250	Admin*
	13		
PB-2			
	1	5516	CE Maj
	1	5525C	Civil Engineer Capt
	1	5525G	General Engineer Lt
	1	55570	Prod Control
	1	55530	Prod Control
	1	55370	Engineer Assistant
	1	55330	Engineer Assistant
	1	54270	Interior Electric
	1	54250	Interior Electric
	2	54230	Interior Electric
	1	54271	Exterior Electric
	1	54251	Exterior Electric
	1	54231	Exterior Electric
	1	54272	Power Prod
	1	54252	Power Prod
	1	54232	Power Prod
	1	54570	Refrig
	1	54550	Refrig
	1	54530	Refrig
	1	54551	Liqu Fuels
	1	54572	Heat
	1	54552	Heat
	1	54532	Heat
	1	55170	Pavements
	1	55150	Pavements
	1	55130	Pavements

	No.	AFSC	Specialty
PB-2 (ctd.)			
	1	55151	Equip Ops
	1	55131	Equip Ops
	1	55299	Structural Superintendent
	1	55273	Structural Technician
	1	55250	Carpentry
	2	55230	Carpentry
	1	55251	Masonry
	1	55252	Metals
	1	55275	Plumbing
	1	55255	Plumbing
	2	55235	Plumbing
	1	56650	Entomology
	2	56651	Environmental
	1	6455X	Supply*
	1	70250	Admin*
	45		
PB-3			
	1	5525G	General Engineer Capt
	1	55530	Prod Control
	1	55350	Eng Assistant
	1	54299	Electr Superintendent
	1	54250	Interior Electric
	1	54230	Interior Electric
	1	54251	Exterior Electric
	1	54231	Exterior Electric
	1	54252	Power Prod
	1	54232	Power Prod
	1	54550	Refrig
	1	54530	Refrig
	1	54552	Heat
	1	54532	Heat
	1	55151	Equip Ops
	1	55131	Equip Ops
	1	55273	Structural Technician
	1	55250	Carpentry
	1	55230	Carpentry
	1	55255	Plumbing
	1	55235	Plumbing

	No.	AFSC	Specialty
PB-3 (ctd.)			
	1	56630	Entomology
	1	56651	Environmental
	1	56631	Environmental
	1	6455X	Supply*
	25		
PB-4			
	1	55199	Pavements/Equ Ops Superintendent
	1	55170	Pavements
	1	55150	Pavements
	1	55130	Pavements
	2	55171	Equ Ops
	4	55151	Equ Ops
	2	55131	Equ Ops
	12		
PB-6			
	1	57190	Fire Prot Superintendent
	2	57170	Fire Prot
	3		
PB-7			
	1	57170	Fire Prot
	6	57150	Fire Prot
	5	57130	Fire Prot
	12		
PB-8*			
	1	57150	Fire Prot
	2	57130	Fire Prot
	3		
PB-9*			
	3	5525G	CE Officer
	3		
PB-10*			
	1	55350	Eng Assistant
	2	55330	Eng Assistant
	3		
PB-11*			
	1	55570	Prod Control
	2	55530	Prod Control
	3		
PB-12*			
	1	54250	Interior Electric
	2	54230	Interior Electric
	3		
PB-13*			
	1	54251	Exterior Electric
	2	54231	Exterior Electric
	3		

	No.	AFSC	Specialty
PB-14*			
	1	54252	Power Prod
	2	54232	Power Prod
	3		
PB-15*			
	1	54550	Refrig
	2	54530	Refrig
	3		
PB-16*			
	1	54571	Liqu Fuels
	2	54531	Liqu Fuels
	3		
PB-17*			
	1	54552	Heat
	2	54532	Heat
	3		
PB-18*			
	1	54573	Controls
	2	54533	Controls
	3		
PB-19*			
	1	55150	Pavements
	2	55130	Pavements
	3		
PB-20*			
	1	55151	Equ Ops
	2	55131	Equ Ops
	3		
PB-21*			
	1	55250	Structures (Carpentry)
	2	55230	Structures (Carpentry)
	3		
PB-22*			
	1	55251	Masonry
	2	55231	Masonry
	3		
PB-23*			
	1	55272	Metals
	2	55232	Metals
	3		
PB-24*			
	1	55255	Plumbing
	2	55235	Plumbing
	3		

	No.	AFSC	Specialty
PB-25*			
	1	56670	Entomology
	2	56630	Entomology
	3		
PB-26*			
	1	56671	Environmental
	2	56631	Environmental
	3		

* Noncritical ("Non-core")

Appendix E: CS-1 Team Detailed Manning Chart (14:56)

No.	AFSC	Specialty
1	05516	CE Lt Col
1	10090	First Sgt*
1	70230	Apprentice Admin*
1	70250	Admin Specialist*
1	05525G	General Engineer Capt
1	55330	Apprentice Eng Assistant*
3	55350	Eng Assistant Specialist
4	55350	Eng Assistant Specialist*
1	55370	Eng Assistant Technician
2	55370	Eng Assistant Technician*
1	05516	CE Maj
5	05525G	General Engineer Capt
2	05525G	General Engineer Capt*
1	55550	Prod Control Specialist
5	55550	Prod Control Specialist*
1	55570	Work Control Technician
2	55570	Work Control Technician*
1	70230	Apprentice Admin*
1	70250	Admin Specialist*
1	75172	Training Technician*
2	64550	Inventory Mgt Specialist*
1	64570	Inventory Mgt Supv*
1	64551	Facility Inventory Specialist*
1	55100	Pavements/Equ Ops Mgr*
4	55131	Apprentice Equ Ops
4	55151	Equ Ops
3	55151	Equ Ops*
2	55171	Equ Ops Technician
1	55171	Equ Ops Technician*
4	55130	Apprentice Pavements
2	55130	Apprentice Pavements*
3	55150	Pavements Specialist
4	55150	Pavements Specialist*
1	55170	Pavements Technician
1	55170	Pavements Technician*
2	55273	Structural Technician*
1	55299	Structural Superintendent*
9	55230	Apprentice Carpentry*
2	55250	Carpentry Specialist

No.	AFSC	Specialty
7	55250	Carpentry Specialist*
1	55235	Apprentice Plumbing
6	55235	Apprentice Plumbing*
2	55255	Plumbing Specialist
5	55255	Plumbing Specialist*
1	55275	Plumbing Technician
1	55275	Plumbing Technician*
3	55232	Apprentice Metals*
3	55252	Metals Specialist*
1	55272	Metals Technician*
1	55231	Mason*
2	55251	Masonry Specialist*
7	54530	Apprentice Refrig*
2	54550	Refrig Specialist
5	54550	Refrig Specialist*
2	54570	Refrig Technician*
3	54533	Controls Specialist*
1	54573	Controls Technician*
1	54531	Apprentice Liqu Fuels*
2	54551	Liqu Fuels Specialist
6	54532	Apprentice Heat*
1	54532	Apprentice Heat
7	54552	Heat Specialist*
1	54552	Heat Specialist
1	54572	Heat Technician*
1	54572	Heat Technician
1	54299	Electrical Superintendent*
4	54230	Apprentice Electrician*
1	54230	Apprentice Electrician
3	54250	Electrician*
2	54250	Electrician
2	54270	Electrical Technician*
1	54231	Apprentice Lineman*
2	54231	Apprentice Lineman
2	54251	Lineman Specialist*
2	54251	Lineman Specialist
1	54271	Lineman Technician
3	54232	Apprentice Power Prod*
1	54232	Apprentice Power Prod
3	54252	Power Prod Specialist*
2	54252	Power Prod Specialist
1	54272	Power Prod Technician

No.	AFSC	Specialty
4	56631	Apprentice Env Support*
3	56651	Env Support Specialist*
1	56651	Env Support Specialist
1	56671	Env Support Technician
1	56630	Apprentice Pest Mgt*
2	56650	Pest Mgt Specialist*
200		

* Noncritical ("Non-core")

Note- Fire Protection Teams retain same designation (PB-6, -7, -8) and same make-up.

Note- CS-2, -3, and -4 "Prime BEEF Combat Support Squadrons" combine to form the standard CS-1 team. See AFR 93-3, 20 Nov 87 for their manning.

Appendix F: Thesis Research Interview Methodology

This appendix is a more detailed account of the thesis research, accomplished through personal and telephone interviews, than could be included in Chapter I.

The Readiness staffs of HQ AFLC and HQ AFESC include many individuals with years of experience in Prime BEEF operations, a fact that was ascertained through informal contact with the staff members. A personal invitation to be part of the research process was extended to each of the experts. Their positive responses established each as an interview candidate. Interviewees were then sent a cover letter (reiterating the invitation), a brief description of the thesis, and a copy of the applicable interview format prior to the meeting. Perhaps the most interesting and productive aspect of this effort was the emergence of the "buddy" network that became evident with the interviewees at HQ AFLC/DEMO and HQ AFESC/DEO. A large group of senior officers and non commissioned officers have remained in the readiness and planning career fields, to build upon and best use their expertise (35). The individuals in this informal group identified many of their contemporaries as sources of information and interview candidates; seventeen persons were interviewed, from their various perspectives as career Prime BEEF members, Engineering and Services Directors, or implementors of the new CS-team structure.

The interview experience provided many answers to investigative questions two and four, and was the basis for Chapter III, in which reconfiguration implications and outcomes, perhaps not as obvious to individuals without the background of the interviewees, were studied.

Interviewees

Rank/Name	Title/Organization
Maj Gen William Gilbert*	Retired Director, USAF Engineering and Services
Maj Gen Clifton Wright*	Retired Director, USAF Engineering and Services
Col George Romero**	DE/HQ AFRES
Col James Zody**	DE-1/HQ AFLC
Col Warren Dickerson**	DEO/HQ AFESC
Col Joseph Hicks**	DEM/HQ AFLC
Lt Col Gerald McMahon**	DEP/HQ AFRES
Maj Sanford Graham**	DEM/92 CES
Capt Juan Ibanez**	DEOP/HQ AFESC
Capt Ronald Carrigg***	DEO/325 CES
Lt Robert Wynn***	DEO/2750 CES
CMSgt Joseph Smith (Ret.)**	Readiness Technician, HQ AFESC/DEOP
CMSgt Robert Jacobs**	Readiness NCO, HQ AFESC/DEOP
CMSgt Carroll Hamilton**	Readiness NCO, HQ AFLC/DEMO
CMSgt Gerald Gannett***	Readiness NCO, 2750 CES
MSgt Edward Greer**	Readiness Technician, HQ AFLC/DEMO
MSgt John Ryan***	Readiness NCO, 325 CES

* Engineering and Services Director Perspective Interview
** Career Perspective Interview
***Current Reorganization Interview

Interview Questions

Air Force Engineering and Services Director Perspective

1- Was the concept of reorganization, as it took place during your tenure, indicative of your own opinions of existing capabilities and required capabilities?

2- What were the most pressing issues that you wished to resolve?

3- Were there any issues that you don't feel were adequately resolved?

4- Were physical requirements an impediment to the pursuit of ideological issues (i.e. logistics vs. optimal posture)?

5- Do you have any opinions regarding the conceptual basis or capabilities of Prime BEEF organizations as compared to the one you implemented?

6- Do you foresee emerging technical, fiscal, or international issues that could prompt further reorganization?

Career Perspective, Prime BEEF Reorganizations

1- What portion of your career has been in readiness?

2- What experiences have you had with particular readiness operations?

3- Do you attribute successes or failures to either administrative or organizational causes?

4- Have you been involved operationally with more than one Prime BEEF organizational structure?

5- Do you have any opinions regarding any organization's merits or detractions relative to the other organizations?

6- Have you been involved in Prime BEEF policy making?

7- What were the major concerns and goals of the policy efforts?

8- What were the outcomes of these policy efforts?

9- What are your opinions on the transformation of Prime BEEF organization over time?

Current Prime BEEF Reorganization Implementation

1- What is your approximate cost for new equipment purchases related to the reorganization, if any?

2- What is the approximate value of equipment rendered obsolete by the reconfiguration, if any?

3- What was your official reorganization start date?

4- Was your actual start date different? If so, why?

5- What is your official reorganization completion date?

6- Is your anticipated completion date different? If so, why?

7- Has the reorganization process affected your ability to deploy or employ for war? If so, how?

8- Has the reorganization process impacted upon any other squadron initiatives or policies?

Appendix G: Glossary of Terms, Acronyms/Abbreviations Used

Acronym/Abbr.	Definition
ABSO	Air Base Survivability and Operability
ACSC	Air Command and Staff College
AFB	Air Force Base
AFCE	Air Force Civil Engineering
AFESC	Air Force Engineering and Services Center
AFESC/DEO	AFESC Readiness Directorate
AFIT	Air Force Institute of Technology
AFIT/DE	AFIT School of Engineering and Services
AFIT/LS	AFIT School of Systems and Logistics
AFLC	Air Force Logistics Command
AFLC/DE	AFLC Engineering Directorate
AFLC/DEM	AFLC Operations and Maintenance Division
AFLC/DEMO	AFLC Readiness Branch
AFRCE	Air Force Regional Civil Engineer
AFRES	Air Force Reserve
AFRES/DEP	AFRES Planning Division
ANG	Air National Guard
AFSC	Air Force Specialty Code
BB	Bare Base
BCE	Base Civil Engineer (Position)
BCE	Base Civil Engineering (Career Field)
BDR	Bomb Damage Repair
BEET	Base Engineer Emergency Team
BEEF	Base Engineer Emergency Force
BRAAT	Base Recovery After Attack
BRASS	Prime BEEF Reporting, Analysis, and Status System
Capt	Captain
CE	Civil Engineering
CF	Contingency Force
CMSgt	Chief Master Sergeant
COB	Colocated Operating Base
Col	Colonel
COMPES	Contingency Operation/Mobility Planning and Execution System
COMPES/ LOGMOD-B	COMPES Logistics Module-Base Level
CONUS	Continental United States
CS	Combat Support
DCS	Deputy Chief of Staff
DEW	Distant Early Warning
DOL	Dispersed Operating Location
DOD	Department of Defense
FOL	Forward Operating Location
FORSTAT	Air Force Status and Identity Report System
Gen	General
HRC	Historical Research Center

Acronym/Abbr.	Definition
HQ	Headquarters
ICBM	Intercontinental Ballistic Missile
JCCRS	Joint Contingency Construction Requirements Study
JCS	Joint Chiefs of Staff
Lt	Lieutenant
Lt Col	Lieutenant Colonel
Lt Gen	Lieutenant General
Maj	Major
MCST	Mobile Combat Support Team
MOB	Main Operating Base
MSB	Main Support Base
MSgt	Master Sergeant
NATO	North Atlantic Treaty Organization
NCO	Non-commissioned Officer
OB	Operating Base
O&M	Operations and Maintenance
PACAF	Pacific Air Forces
PB	Prime BEEF
RRR	Rapid Runway Repair
SALT	Strategic Arms Limitations Talks
SORTS	Status of Resources and Training System
TDY	Temporary Duty
TIGER	Team Integrity Generates Engineer Readiness
TPFDL	Time Phased Force Deployment Listing
UDL	Unit Detail Listing
UNITREP	Unit Status and Identity Report System
USAF	United States Air Force
USAFE	United States Air Forces, Europe
UTC	Unit Type Code

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ABSTRACT

This thesis reviews the origins, impacts, and implications of four Air Force Civil Engineering (AFCE) Prime Base Engineer Emergency Force (BEEF)organizational structures from 1978 to 1987. Literature review and interview performance were the two primary methods employed to assess the present state of the Prime BEEF (PB) program; the study examined the issues in United States Air Force (USAF) use of the PB program for present and future combat engineering deployment and employment.

The research process, along with the results of a review of the thesis by AFCE professionals, indicated that the Prime BEEF concept has benefitted from reconfiguration and is presently more diverse and adaptable than ever before. While the present posture is not as applicable to the few specific combat scenarios that influenced earlier alignments, it appears that the new Combat Support program is a successful attempt to prepare for the volatile battlefield of today and the rapidly evolving technology of tomorrow.

The text of this thesis reviews many origins and possible applications of today's Prime BEEF organization, indicating that this AFCE program has been refined successfully and is ready for use in many future problem-solving roles.